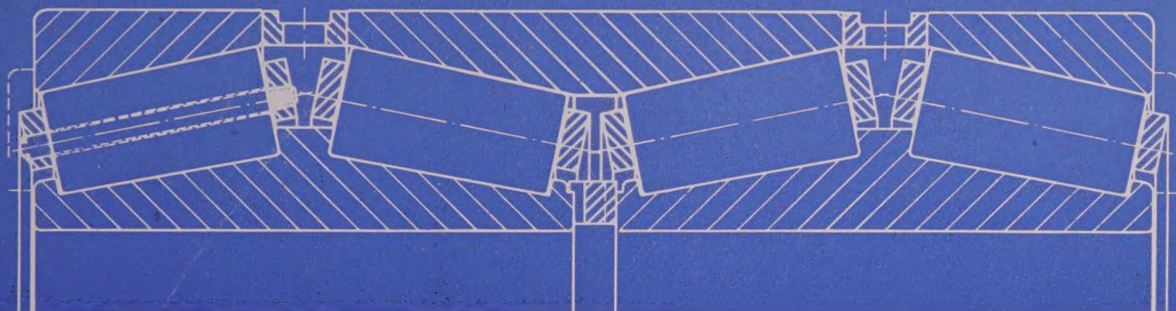


ts—p. 37
 Aluminum Sheet—p. 42
 ern Pickling Line—p. 46
 g Auto Fenders—p. 51
 ized Foundry—p. 54
 g Titanium—p. 58
 ial News Summary—p. 93
 on Scrap—p. 95
 als Handling Show—p. 102C

The

IRON AGE

JANUARY 13, 1949



HOW TO GET EVERYTHING THERE IS IN ROLL NECK BEARING EFFICIENCY, ECONOMY, ENDURANCE

Every modern requirement in roll neck bearings is provided by Timken Balanced Proportion Bearings.

They assure smooth, friction-free operation under every condition of speed and load.

They contribute importantly to maximum mill rigidity and minimum roll deflection by permitting the use of larger roll necks (average size, 71% of the O.D. of the bearing).

They permit re-starting of mills under full load after routine or emergency stoppages without disturbing the gauge setting of the

rolls, losing steel or damaging the bearings.

They enable rolls to be changed easier in less time because there is no complicated lubrication system to hamper roll changing.

They employ the simplicity, directness and economy of grease lubrication.

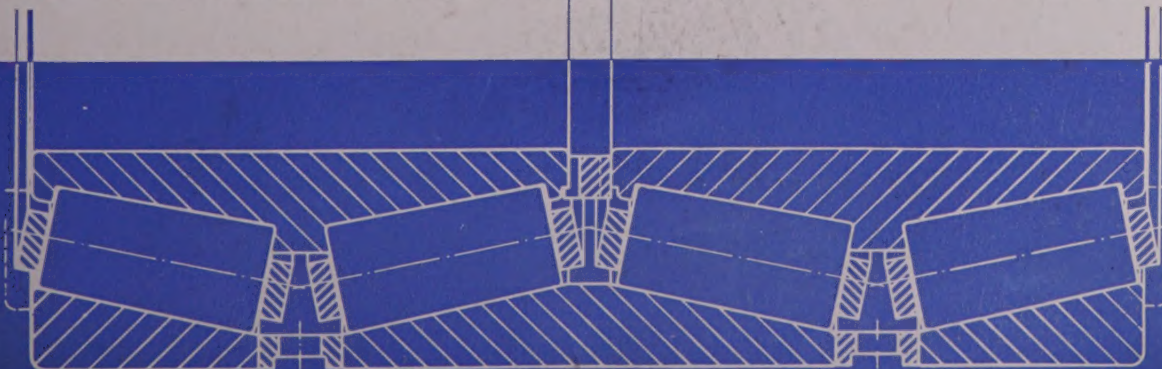
Are you getting all these roll neck bearing advantages in your present rolling mills? Will you have them in your new mills? You can

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROLL NECK BEARINGS

have them in both existing and new equipment through Timken Balanced Proportion Bearings. Specify them.

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

CABLE ADDRESS "TIMROSCO"



Bearing failures ended

when Farval was installed

on forging presses

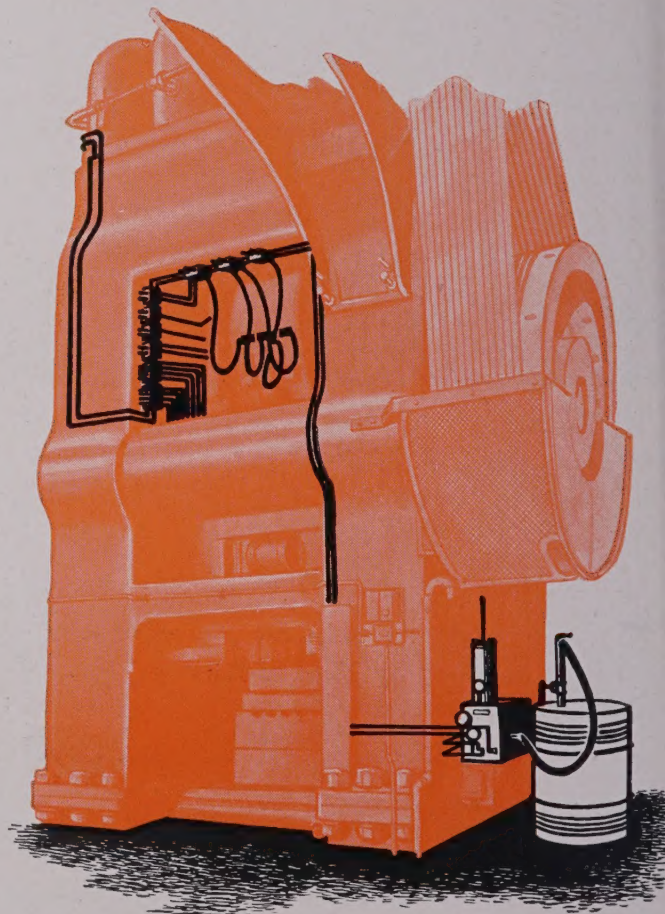
IN a metal working plant, upsetters and forging presses were always in trouble due to improper lubrication. Failures occurred unexpectedly, because of irregular and inadequate delivery of oil to Pitman and other important bearings. Valuable production time had to be sacrificed in making frequent repairs. The cost of each overhaul ran \$3,500 to \$5,000 in labor and parts alone.

Finally, Farval Systems of Centralized Lubrication were installed. Since then there has not been a single bearing failure. Not one overhaul has been necessary. Upsetters and forging presses work smoothly and continuously, doing their jobs efficiently and exactly as they were designed by their builders to do.

Farval delivers oil or grease under pressure to a group of bearings from one central station, in exact quantities, as often as desired. It can do its work while a machine is in operation. Farval is the Dualine System with the Positive Piston Displacement Valve. This valve has but two moving parts and is fully adjustable, with a Tell-tale indicator at each bearing to show the job is done.

For a full description of Farval, write for Bulletin 25. The Farval Corporation, 3252 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm & Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



 **FARVAL—Studies in
Centralized Lubrication
No. 101**





HERE'S EXTRA VALUE... PROFITABLE

UNIFORMITY

Roebling
Oil-Tempered
Spring Wire

CUTS MACHINE STOPPAGES AND REJECTS

PRODUCTION GOES INTO HIGH with Roebling Oil-Tempered Spring Wire. Every inch is just like every other inch . . . same gauge and grain structure . . . same strength, hardness and finish. And more than that, the dependably uniform analysis of Roebling

Spring Wire enables you to maintain your specified quality standards without variation.

Roebling Oil-Tempered Spring Wire, in the higher carbons, is available in all standard sizes. From making the steel to the finished product, every manufac-

turing phase is performed in Roebling's own plants. Modern equipment and techniques assure wire of topmost quality . . . and it's available now!

Your Roebling Field Man will be glad to help you select the right wire—round, flat or shaped—for top performance and economy in your own products. John A. Roebling's Sons Company, Trenton 2, New Jersey.

—WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST—
ROEBLING OFFICE AND WAREHOUSE

Atlanta, 934 Avon Ave. ★ Boston, 51 Sleeper St. ★ Chicago, 5525 W. Roosevelt Rd. ★ Cleveland, 701 St. Clair Ave., N. E. ★ Denver, 1635 17th St. ★ Houston, 6216 Navigation Blvd. ★ Los Angeles, 216 S. Alameda St. ★ New York, 19 Rector St. ★ Philadelphia, 12 S. 12th St. ★ Pittsburgh, 855 W. North Ave. ★ Portland, Ore., 1032 N. W. 14th Ave. ★ San Francisco, 1740 17th St. ★ Seattle, 900 First Ave.

ROEBLING

☆ A CENTURY OF CONFIDENCE ☆

**Improve Surface Finishes
Increase Tool and Die Life**

with
**PANGBORN
HYDRO-FINISH**



What is Pangborn Hydro-Finish?

It's the new, versatile impact blasting process that uses a fine mesh abrasive suspended in water, yet holds tolerances of the work to .0001 inches.

What Hydro-Finish can do for you Pangborn Hydro-Finish can help you three ways, by improving surface finishes, by removing oxide scale, by lengthening tool and die life through proper maintenance. Here's how . . .

In the Production Line . . . It eliminates many tedious finishing operations. It reduces cost and time involved in buffing. It improves fatigue life of the metal parts it finishes. It cuts many varied manufacturing costs.

In the Tool Room . . . New Hydro-Finish simplifies the manufacture and maintenance of tools, dies and molds. It reduces usual costly handwork and produces a surface virtually free from directional grinding lines.

Write today for details about the new Pangborn Hydro-Finish Cabinet. PANGBORN CORPORATION, 1201 Pangborn Blvd., Hagerstown, Md.

Look to Pangborn For All Latest Developments In Blast Cleaning And Dust Control Equipment.

Pangborn

BLAST CLEANS CHEAPER
with the right equipment
for every job

Fatigue Cracks

BY C. T. POST

Hitler Again?

• • Our counter-espionage division, operating independently of all other intelligence agencies, hands us the name of Colin Fink, head, Division of Electrochemistry, Columbia University. A published review of Dr. Fink's opinion on the rare metal situation quotes him as saying:

"There is a demand for ductile, malleable beryllium and germanium."

We're handing this one along to Columbia's President Eisenhower without comment. He should know what to do about it from past experience.

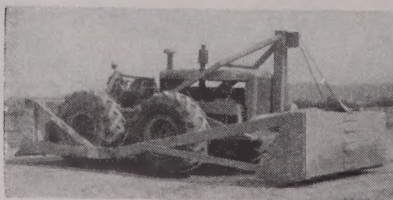
New Isotope

• • Our neighbor to the east, "Newsfront," has its ear too close to the ground to hear us, but we understand that Frankfurt scientists have isolated a new isotope of germanium. Name: Bizonium.

Answer Man

• • Winding up our wide-eyed discovery of a "calfdozer"—a small bulldozer blade hung on a midget tractor (Fatigue Cracks, Nov. 25)—we tucked our tongue in cheek and asked, "To complete the family, can anyone tell us what a 'cowdozer' could be?"

With R. G. LeTourneau, Inc., still turning out a new type of earthmoving equipment daily, we should have known better than to ask a question like that. R. A. Zibert, field engineer, merely dug into his briefcase and mailed us this shot of a cowdozer connected to the rear of a LeTourneau rubber-tired tractor with a bulldozer blade on the front.



"The cowdozer," explains Reader Zibert, "is used in conjunction with the bulldozer blade and its operation is similar to that of the original drag scrapers. It is designed for use in levelling operations. The cowdozer cuts down the high spots and carries the material, which is deposited in corresponding low areas. Generally speaking, our version of a cowdozer is any blade attached to the rear of a tractor which can perform the basic functions of a dozer blade and has

some of the characteristics of a bottomless or drag scraper."

That should take care of all bovine dozers. Now, how about a cat dozer (speak up Caterpillar) or dog dozer? Any other questions?

Invitation

• • The editors of *American Magazine* dropped us a penny postcard:

"A story, 'The Long Honey-moon,' by Howard Linn Edsall, will appear in the January issue of *The American Magazine*, to be published December 31. We thought you might be interested."

Nope, not interested. Have a wife and three kids at home already.

Correction Corrected

• • "Re your column in December 23 issue of your f.f.j. The writer's name to whom you allude is Wodehouse not Woodhouse. P. G. Wodehouse, that is."

—A Devoted Reader

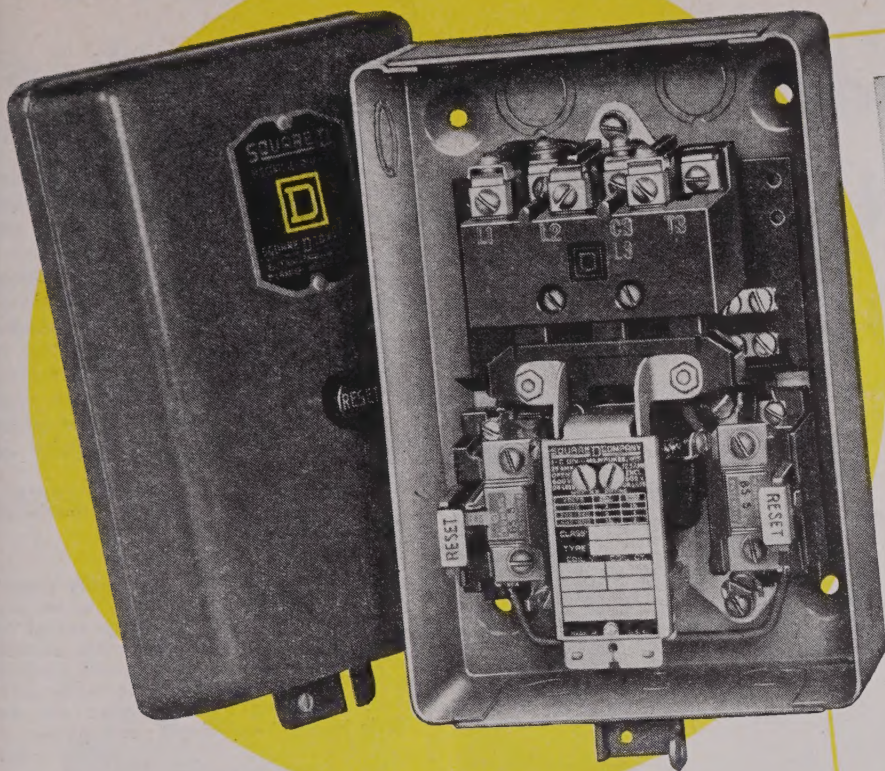
Now see here, Jeeves. It wasn't Wodehouse, old chap, that we dreamt of enmeshed with the Secretary of the Treasury, à la the Japanese finance minister. How can you forget a name like Chase Going Woodhouse, particularly when the lady happens to be a member of Congress.

Yardstick

• • We see by the papers where the PRESIDENT wants the government to build a steel mill to be used as a yardstick for the private steel industry, in the same manner that TVA was used for power. With construction costs being what they are, and amortization inevitably heavy, the yard would move up to 40 in. or so in terms of steel prices. But, as long as the government is getting in lots of other things, why not the gray market?

Shmoo

• • Scientists are on the threshold of controlling or duplicating the process of photosynthesis, thanks to atomic energy research. Implications are that the day is not too far off when they can manufacture roots, berries, cream puffs, or beef-steaks—at least the equivalent in terms of proteins, carbohydrates, and other goodies. Columnist Stewart Alsop refers to the process as the "photosynthetic Shmoo." It's practically Shmooperhuman, anyhow.



Even the *Best* MOTOR STARTERS Need Inspection and Maintenance

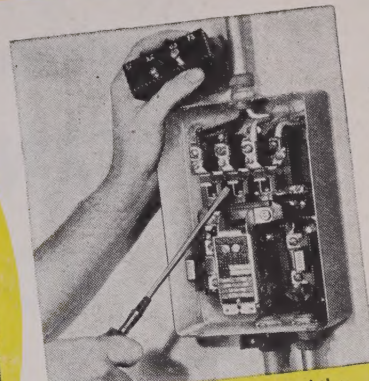
ALL starters require periodic contact replacement under conditions of heavy load or frequent operation. Some may require magnet coil exchange to match voltage and frequency of power supply. That's why Square D has always stressed accessibility—simplifying installation, inspection and normal maintenance.

NEW "OFF-THE-SHELF" PARTS KITS MAKE NORMAL MAINTENANCE EASIER THAN EVER!

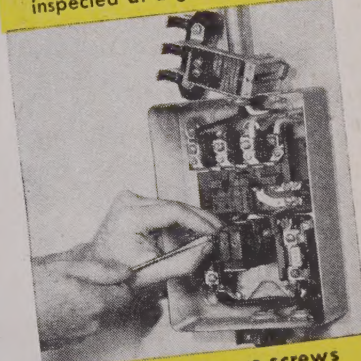


• Now, replacement parts for Square D starters are packaged in easy-to-stock kits. Each kit contains parts necessary to replace all load contacts on two or three-pole starters. Parts are individually packaged in clearly labeled envelopes. An illustrated service bulletin is enclosed to provide quick parts identification and complete installation instructions.

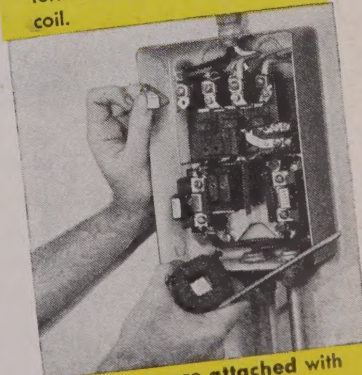
Write for Bulletins 8536 and 9998. Square D Company,
4041 N. Richards St., Milwaukee 12, Wisconsin



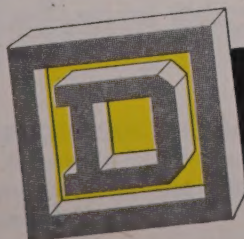
Loosen two screws and the arc chamber cover comes off. Every contact surface can be inspected at a glance.



Remove two more screws and entire armature and movable contact assembly can be lifted off. Disconnect two wires from screw-type terminals and slip off magnet coil.



Contacts are attached with separate screws—can be removed and replaced without disturbing any wiring. Screw-driver is only tool needed.



SQUARE D COMPANY

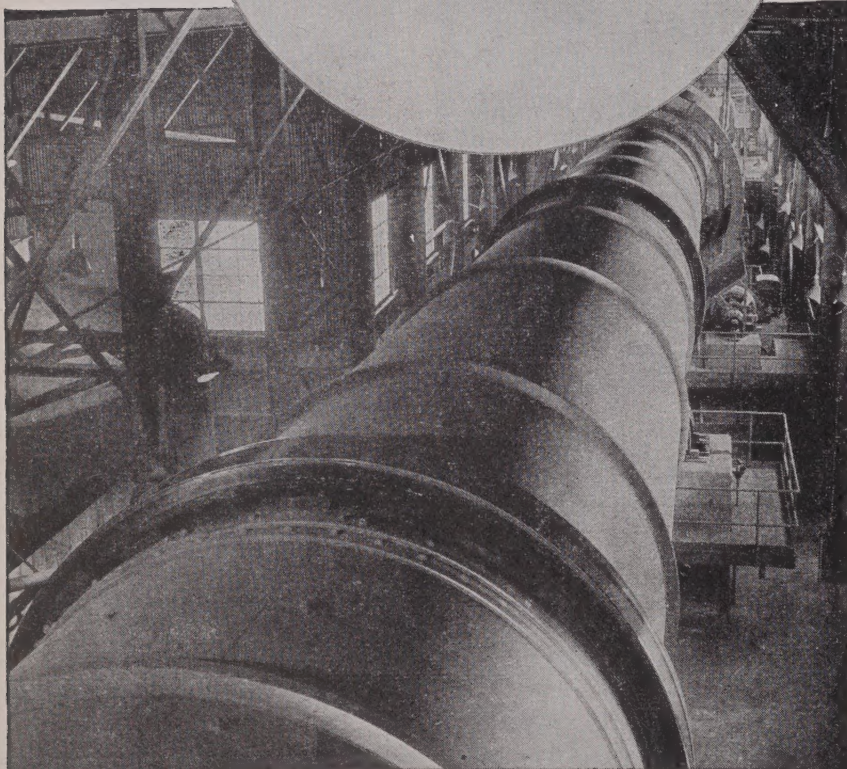
DETROIT

MILWAUKEE

LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

Anaconda MANGANESE NODULES



PRODUCTION of manganese nodules from the rhodochrosite ores of Butte's mines totalled 115,197 long tons in 1947, with an average manganese content of 59.62%. Anaconda's production is the principal U.S. source of supply for producers of ferro-manganese and other consumers of metallurgical grade ore.

Illustrated above is the 270-foot kiln at the Anaconda Reduction Works in which the manganese concentrates are sintered at a temperature of 2600° F.

48356



ANACONDA COPPER MINING COMPANY

Offices: 25 Broadway, New York 4, N. Y.

Anaconda, Montana

Dear Editor:

CENTRIFUGAL CASTING

Sir:

The article "New Mold Coating Widens Centrifugal Casting Use" in the Dec. 2 issue has been found very interesting. Do you believe a rolled shell casting weighing 21,000 lb and with a 71-in. OD, a 40-in. ID and a 29½-in. height could be produced centrifugally in steel? Would analyses producing abnormal shrinkages in steel casting be a like problem in casting centrifugally? I would appreciate your comments and hope that you can give me names of companies producing castings centrifugally of the above size.

HUBERT CHAPPIE
Foundry Superintendent

National Supply Co.
Torrance, Calif.

● Castings of the size you specify cannot now be produced centrifugally as no one in the field has equipment large enough to handle the job. It is questionable whether or not the investment in equipment required for such work would be economically justified. Abnormal shrinkage rates are not likely to affect centrifugally cast pieces.

—Ed.

POWDER METALLURGY

Sir:

We were much interested in the article "Magnetic Powder of Colloidal Size" in the Aug. 19 issue. The fine iron powders described are of special interest to us for use in work on the magnetic-fluid clutch, a recent development of J. Rabinow, National Bureau of Standards.

We are seeking such information as uniformity of size, shape of particles, purity of product, magnetic behavior of particles in fluid suspension and availability of products. Therefore, any information you can supply or leads you can give us will be very much appreciated.

A. J. PARZIALE
Servomechanisms Laboratory

Mass. Institute of Technology,
Dept. of Electrical Engineering
Cambridge, Mass.

● The article was abstracted from the publication "Metal Powder Report," published by Powder Metallurgy Ltd., London. An inquiry to them would provide you with such further information as is available. Also you would probably be interested in the report "Determination of the Effect of Particle Size on the Properties of Commercial Iron Powders and Compacts," designated PB 95054, and available from the Office of Technical Services, Dept. of Commerce, Washington.

—Ed.

SCRAP SPECIFICATIONS

Sir:

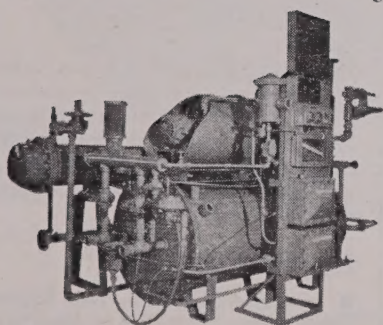
Could you inform us where we could obtain specifications for the

Pure Nitrogen (99%+) at 1/10 your present cost!

If you have Kemp equipment, skip the rest;
you've got rock-bottom cost right now!

If you're buying bottled gas, think hard about
the savings to be effected by making your
own gas.

Kemp Nitrogen Generators will give you
99%+ Nitrogen, free of CO₂ and H₂S, dried
to dew points as low as -60° F.



8000 cfh Kemp combustion unit used in conjunction with Kemp Nitrogen producer. Yields 88% Nitrogen, 12% CO₂. Kemp Scrubber, in subsequent operation, eliminates CO₂ and leaves 99%+ Nitrogen.

Make your own nitrogen . . . automatically . . .
dependably . . . free of maintenance costs for
years . . . at a tenth to a sixth the cost of bottled
nitrogen . . . with a Kemp Nitrogen Generator.

Ask to see a Kemp engineer. There's one not
far from you . . . or send the coupon for the
NEW Bulletin No. I-10.

The C. M. Kemp Manufacturing Co.
405 East Oliver Street
Baltimore 2, Maryland

- ☐ Please send me your NEW Bulletin No. I-10
on Inert Gases.
- ☐ Please send a Kemp representative in to
see me.

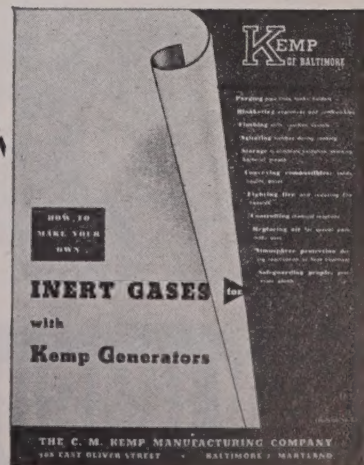
Name.....

Company.....

Street.....

City.....Zone.....

State.....



KEMP OF Baltimore

PRECISION CARBURETORS. BURNERS FOR INDUSTRIAL
HEAT CONTROL. FIRE-CHECKS AND OTHER SAFETY DEVICES.
ATMOSPHERE GENERATORS. INERT GAS PRODUCERS. ADSORP-
TIVE DRYER SYSTEMS FOR PROCESS CONTROL.

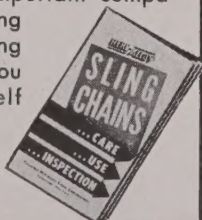
DIA-12

CM
**HERC-
ALLOY**
**SLING
CHAINS**

**You can see
for yourself
that they are
safe.**

Just one of the big advantages of HERC-ALLOY Sling Chains is that you can determine their serviceability by a simple visual inspection.* Ordinary steel or iron chains, on the contrary, grow dangerously brittle with age... an insidious threat to the safety of men and materials. That's why more and more of the important companies are standardizing on HERC-ALLOY Sling Chains...because you can see for yourself that they're safe.

*Write for your copy of this new, informative booklet. No charge.



HERC-ALLOY FEATURES

- America's first alloy steel sling chain...first to bear a serial number.
- Every CM HERC-ALLOY Sling Chain is alloy steel throughout...links, rings, hooks. There is only one grade...the best.
- Every chain is individually tested and accompanied by a certificate of registration.
- Links are side welded for maximum strength by patented INS WELL electric method.
- HERC-ALLOY Chains should never be annealed.
- HERC-ALLOY Chains are lighter...stronger...easier to handle...outlast ordinary chains 4 to 5 times...cost less on the job.

HERC-ALLOY...the chain you can SEE is safe

COLUMBUS-McKINNON

CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

various grades of scrap metal, both ferrous and nonferrous?

ROBT. E. TURNAGE
Engineering Dept.

Sonoco Products Co.
Hartsville, S. C.

● Specifications for the various grades of ferrous scrap are contained in the Yearbook of the Institute of Scrap Iron & Steel, Washington. They will be glad to send you a copy. As for the nonferrous metals, a circular from the National Assn. of Waste Material Dealers, listing specifications, has been mailed.—Ed.

SPRING COILERS

Sir:

Please advise us who manufactures the Torrington and Sleeper coilers and also the Hartley coilers. These machines are used for coiling springs.

G. H. BUGENHAGEN
Manager

Bugenhagen Mfg. Co.
Minot, N. D.

● Torrington Mfg. Co., Torrington, Conn., and Sleeper & Hartley, Inc., Worcester, Mass.—Ed.

DEGREASERS

Sir:

We would appreciate any information you can furnish us concerning small electrically heated degreasing units. If you do not have the information available, can you give us the names of several companies handling this type unit.

HERBERT C. MULLER
Production Enterprises, Inc.
Brooklyn

● Tear sheets from the "New Equipment" section giving information on these degreasers have been sent. You will also find a general listing of companies producing such electrically heated units enclosed.—Ed.

STAINLESS ROLLING MILLS

Sir:

We understand that there are between 20 and 30 mills that roll stainless steel sheets. If you have the names and addresses of these mills, please send them to us.

FRANK GEPPERT
President
Excelsior Tool & Machine Co., Inc.
East St. Louis, Ill.

● The list is in the mail.—Ed.

AURAL PROTECTION

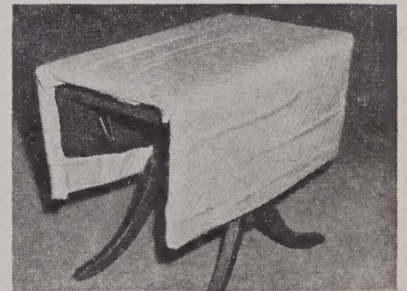
Sir:

We would greatly appreciate it if you would supply us with any information regarding aural protective equipment used in the United States for workers in aircraft engine and propeller test centers. Besides protecting ears against explosive and high frequency sounds, the equipment should incorporate a wireless or telephonic receiver communication between the staff working in the test chamber and engineers in the outside control room.

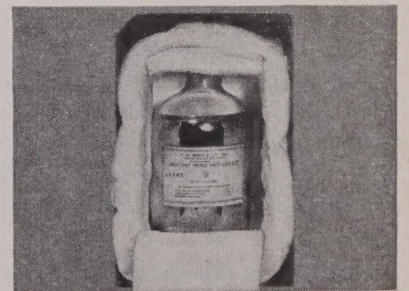
We will be perfectly satisfied if you



Cloud-soft KIMPAK shields this handsome dispenser from damage during shipment. Photo courtesy Temprite Mfg. Co., Inc.



Surface Protection — Drop-leaf table. Photo courtesy Phoenix Chair Company.



Flotation Packaging — Mercury bottle. Photo courtesy F. W. Berk & Company.

Kimpak Float Packaging*

**bundles of protection
for every product you pack**

Ship confidently and save—thanks to reliable, low-cost KIMPAK* creped wadding. A versatile, efficient cushioning material, KIMPAK provides protection in packaging for the smallest, most delicate items to heavy and bulky products. Made in a variety of types, thicknesses and backings to suit your particular needs. You'll find a specification of cushiony KIMPAK to meet every requirement of the Four Basic Methods of Interior Packaging—Sur-

face Protection, Blocking and Bracing, Flotation Packaging and Absorbent Packaging.

Soft, flexible and feather-light—KIMPAK adds little weight or bulk to shipments. It is made either liquid absorbent or liquid repellent. Highly resilient, it effectively withstands shock and vibration. Spotlessly clean, KIMPAK improves the appearance of any package. No wonder so many fine products are wrapped for market with KIMPAK.

Free book for you. Call or write your local distributor for this fact-filled booklet on better packaging methods. He is listed in the Classified Phone Directories. Or, if you wish, merely mail this coupon.

.....
KIMBERLY-CLARK CORPORATION
Creped Wadding Division, Neenah, Wis.

Please send me the free KIMPAK booklet on better packaging methods. **IA-149**

Name

Firm

Type of Business

Address

City, Zone, State

Kimpak

REG. U.S. PAT. OFF. & FOREIGN COUNTRIES

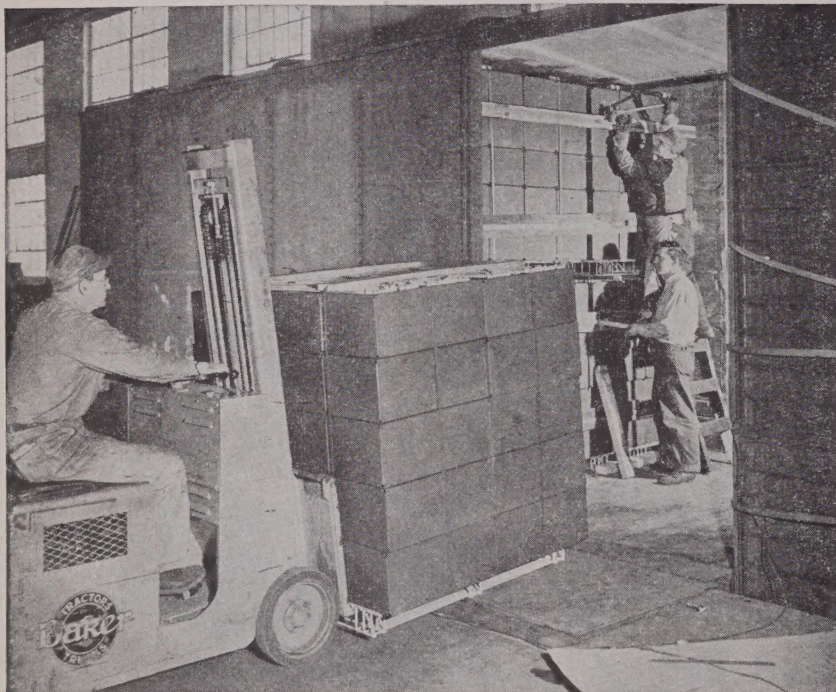


CREPED WADDING

*T. M. Reg. U. S. & Can. Pat. Off.

BAKER

Light-weight FORK TRUCK
helps Charles T. Brandt Inc.
set a production record!



This company recently completed and shipped 140,000 special metal container units in 70 days. The job comprised 18,480,000 operations to produce assemblies from 3,080,000 separate pieces converted from

5,000,000 pounds of sheet steel... Making this record required on-the-dot assembly line coordination of production processes—plus *packing on pallets* and loading into box cars for shipment on schedule.

The handling problem involved loading several cars per day with pallet loads double-decked—each pallet load weighing approximately 1400 lbs. A Baker FQH Fork Truck was in almost constant use.

The estimated man-power saving in storing, transporting and loading was about 6 men over manual methods. In fact, it would have been virtually impossible to accomplish this record by purely manual handling.

See us at the 3rd
National Material
Handling Exposition,
Philadelphia,
Jan. 10-14, 1949.

BAKER INDUSTRIAL TRUCK DIVISION of The Baker-Raulang Co.

1227 West 80th Street • Cleveland 2, Ohio

In Canada: Railway and Power Engineering Corporation, Limited

Baker INDUSTRIAL TRUCKS

can let us have the addresses of firms producing the above described material.

*Arsenal de l'Aeronautique
Chatillon-Sous-Bagneux, Seine, France*

● We have checked with the principal aircraft engine factories and government testing installations and find, in all instances, that sound-proofed test chambers, with which such equipment is unnecessary, are used. Air Materiel Command, Dayton, replied that where required, standard ear plugs are used under radio headphones. Accordingly, we are forwarding you the name and address of the company supplying AMC. Perhaps they will have further information for you. On the possibility that you might be interested in setting up a sound-proof installation, the names of companies making such chambers have also been sent.—Ed.

CAUSTIC SODA PLANT

Sir:

We have received a request from our Johannesburg office in behalf of one of their clients who desires to be put in touch with a manufacturer in a position to submit a quotation for a complete plant for the manufacture of caustic soda from salt produced from sea water.

We will be grateful for any information you can give us.

*GEO. L. CHARLTON
Fenchurch Export Corp.
New York*

● Names of contracting engineering firms probably able to design and build such a plant have been mailed.—Ed.

HIGH FREQUENCY GENERATORS

Sir:

We should be very grateful if you can put us in touch with makers of high frequency generators for induction furnaces.

*J. LIEUTAUD
Chambre Syndicale des Producteurs
d'Aciers Fins et Speciaux
Paris, France*

● Names of companies producing such generators have been sent.—Ed.

CHROME PLATING

Sir:

We are interested in securing information regarding chrome plating and chrome plating on aluminum. Any information that you could give us will be greatly appreciated.

*ADOLPH V. KLANCNIK
Afco Products, Inc.
Chicago*

● Tear sheet copies of articles on the subjects have been mailed. You would probably also find the "1948 Guide Book & Directory for the Metal Finishing Industries," published by Finishing Publications, Inc., New York, of interest.—Ed.

STAMPING MACHINE

Sir:

We are interested in the purchase of machines or equipment for stamping numbers and letters on metal strips. We know machines of this



For 71 Years . . .

the choice of Middle America

GRANITE CITY STEEL

Hundreds of manufacturers know the fine quality of Granite City Steel. And they have discovered the advantages of Granite City's central location. That's why, since 1878, steel from Granite City has been the choice of Middle America.

Granite City Steel is produced by a company large enough to keep abreast with the newest developments of the industry . . . yet small enough to permit precise attention to all the details of manufacture that mean finer quality steel, tailor-made to individual requirements.

GRANITE CITY STEEL COMPANY, Granite City, Illinois

Dallas • Kansas City • Memphis • Minneapolis • Moline • St. Louis

Coils
Cold Rolled Sheets
Porcelain Enameling Sheets
Electrolytic Tin Plate
Corrugated Sheets



Hot-Dipped Tin Plate
Fabricated Products
Stainless-Clad Sheets & Plates
Strongbarn Galvanized Roofing
Electrical Sheets

How continuously it works is what counts

ILLUSTRATED HERE is a handling operation which is typical of the work some trucks perform throughout every shift . . . 24 hours a day! Under such circumstances every delay for servicing or repairs means lost time, lost income.

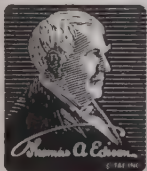
★

The logical truck for such work is an electric truck. Its motor drive stays on the job because it has few wearing parts . . . only one basic moving part.

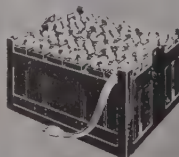
★

The logical battery to power the truck is an EDISON Nickel-Iron-Alkaline Storage Battery. With steel cell construction inside and out, an electrolyte that is a preservative of steel, and a foolproof electrochemical principle of action, EDISON batteries are the longest-lived, most durable and most trouble-free of all.

EDISON batteries give you many advantages: they're mechanically durable; electrically foolproof; quickly and easily charged; simple to maintain; not injured by standing idle. Get a current EDISON price quotation—you will probably find initial cost MUCH LOWER than you think. Couple this factor with well-known EDISON long life and you will have the key to year-after-year economy.



EDISON
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kind are made in the United States, but do not know the names of the manufacturers. Will you let us know to whom we could write?

R. RONATI

*Metalserla
Brescia, Italy*

● Names and addresses of several companies making such stamping machines have been sent.—Ed.

SENDZIMIR MILL

Sir:

At some time in the past, the writer recalls an article written on the Sendzimir mill operated by Washington Steel Co., Washington, Pa. I am not sure whether the article appeared in THE IRON AGE, but if it did, would it be possible to obtain a reprint or tear sheet copy?

J. L. STONE
District Manager

*Copperweld Steel Co.
New York*

● The article is "Washington Steel Starts Sendzimir Mill" from the April 24, 1947 issue. Tear sheets are on their way. You might also be interested in the article "Armco Introduces Sendzimir Mill" which appeared in the July 23, 1942 issue and "Small Precision Cold Strip Mill" which was in the Jan. 16, 1947 issue.—Ed.

STAINLESS DISCOVERY

Sir:

I would appreciate four or five copies of the article "Who Discovered Stainless Steel" from the Oct. 14 issue.

RUSSELL FRANKS
Chief Metallurgist, Technical
Service and Development Dept.

*Electro Metallurgical Co.
New York*

INGOT CAPACITY

Sir:

It will be appreciated if you will send a copy of the article in the Dec. 2 issue showing steel ingot capacity by district.

W. F. KURFESS
Manager

*Joseph T. Ryerson & Son, Inc.
Milwaukee, Wisc.*

IDENTIFYING METALS

Sir:

I would appreciate your sending me a copy of the two-part article "Quick Methods for Identifying Metals" which appeared in the Oct 17 and 23, 1947 issues.

L. S. CRANE
Engineer of Tests

*Southern Railway System
Alexandria, Va.*

FUME CONTROL

Sir:

Please send tear sheets of the articles "Openhearth Fume Control" from the Sept. 9 issue and "Color Metallography" from the Oct. 14 issue.

L. E. CUPP
Asst. Supt., Anode Dept.
International Nickel Co. of Canada, Ltd.
Port Colborne, Ontario

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Vol. 163, No. 2

January 13, 1949

Editorial

Fair Play

39

Technical Articles

Prime Coating Aluminum Sheet	42
Driving and Controlling a Modern Pickling Line	46
Heliarc Welding Auto Fenders	51
Mechanization Boosts Westinghouse Foundry Capacity	54
Vitreous Enamels for Aluminum	57
Melting and Casting Titanium	58
Metallurgy and Heat Treatment of Cutting Tools, Part II	60
New Equipment	65

Features

Fatigue Cracks	26
Dear Editor	28
Newsfront	41
Assembly Line	72
Washington	76
West Coast	80
Personals	84
European Letter	88
Industrial News Summary	92
News of Industry	95
Report on Scrap	95
Machine Tool Labor Productivity	102
Materials Handling Show	102-C
Cost of Industrial Building Stable	107
Car Builders Need More Orders, Steel	108

News and Markets

Industrial Briefs	98
Machine Tool Developments	112
Nonferrous News and Prices	114
Iron and Steel Scrap News and Prices	117
Comparison of Prices by Week and Year	120
Finished and Semifinished Steel Prices	122
Alloy Steel Prices	123
Pipe and Tubing Prices	124
Warehouse Steel and Pig Iron Prices	125
Ferroalloy Prices	126

Index to Advertisers

149-150



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Fair Play

THE American from earliest boyhood is carefully drilled in the precepts of fair play. This calls for equal treatment and no favors. The Crimson and the Blue kick off from the same relative spot in the field. They play under the same set of rules. The referee imposes the same penalty for the same offenses. Any referee who fined the Crimson 15 yards for clipping and deliberately overlooked the same offense by the Blue would have trouble getting off the grounds intact. Should the Blue demand such palpable discrimination they would find themselves without opponents. They would also find themselves ostracized from the world of sport.

Yet politics encourages a more reprehensible form of partisan umpiring and the public accepts it complacently. Consider the problem of monopoly. It is traditionally repugnant to the American for very good reasons. It is by definition the negation of competition and fair play. It implies the destruction of the weak by the strong. It is a brazen assertion that might makes right. Its technique in the field of economics is to make goods or services scarce, to increase their price to the consumer. Its purpose is to produce maximum profit for the monopolist at the expense of the consumer. It erects its selfish, narrow interest as a road block in the path of progress. It says to the community: "You may proceed only if you first pay tribute to me."

Congress controls the power of natural monopolies like railroads and utilities by fixing prices and limiting profits. It has placed all other business under the increasingly severe restrictions of our anti-trust statutes.

At the end of the year the House Small Business Committee reported on its investigation of monopoly and offered some drastic suggestions. When a business executive has been convicted of violating the anti-trust law he should be forbidden for a minimum period of years to serve as an officer of any company doing business in the United States. For further offenses the use of a permanent injunction, whose violation would carry a jail sentence, should be considered.

During the last 16 years the Attorney General's office has brought more than 300 actions under the anti-trust laws against business corporations. It has just filed a complaint against 17 investment houses for alleged monopoly in restraint of trade. There is considerable doubt that any large number of these actions was brought in good faith. They have been started at suspiciously opportune moments to serve the political purpose of the administration in power. If, as and when these defendants are found guilty in a fair trial, no one will suggest that they be sheltered from the impact of the law.

However, is monopoly offensive only when practiced by business? Has any industrial monopoly ever shut off the nation's supply of coal? Has any business combination ever laid siege to an entire community and denied the necessary supply of food and fuel? Do we know any corporate trusts today which have gangs of goons to waylay their competitors and help them see the light with the aid of lead pipes and baseball bats?

If monopoly is an offense against the community, is it any less so when perpetrated by a labor union? If the rules call for punishment, should they apply only to a corporate culprit? Does the Anglo-Saxon concept of fair play have meaning only for business but not for labor?

Joseph Stagg Lawrence



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RYERSON STEEL

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.

January 11, 1949

► Despite talk of some pressure going off steel demand within the next 6 months, ingots have been sold during the past few weeks for \$115 a ton. Orders are for 6 months' delivery and for substantial tonnages.

► Taking advantage of the two principal features of titanium metal -- high strength to weight ratio and resistance to salt water corrosion -- experimental seaplane floats are said to be in the planning stage.

► Italy has a novel plan in mind to overcome her power shortage. She has placed initial orders with Westinghouse Electric International Co. for two 300-hp mud pump motors and one 250-hp draw-works motor. The motors will be used on the drilling rigs set up to tap water sands near red hot lava beds. The high pressure steam being emitted from these beds will then be used to turn large turbine generators. If pilot operations at Larderello are successful, this northern industrial region may circumvent the nation's coal shortage.

► High octane gasoline may come faster than was predicted earlier. With the return of a competitive situation in the petroleum industry, informed sources feel that "a battle of the laboratories" in the industry is almost certain to develop. High octane gasoline may be one of the earliest results of the intensive research now being carried out.

► Modified Man-Ten, a high tensile strength steel, is finding wide application in welded LPG tanks. Use of propane instead of butane calls for higher tank pressures than formerly used. In the modified steel, carbon is restricted to 0.20 instead of 0.25 max and the manganese content is increased. This change in analysis provides the desired strength and promotes better weldability.

The trend in the direction of interchangeable stampings is mixed in the auto industry this year. GM which covers its complete line with an A, B and C body, appears to be heading for a policy of using fewer basic dies. Chrysler, whose body stampings have been highly interchangeable, is reported this year to be favoring more individuality in its cars. Ford appears to favor the GM trend insofar as the Lincoln and Mercury are concerned.

► To break the manufacturing bottleneck in all-glass tubes, to reduce weight and lower costs, television tubes are now being made entirely of steel except for the conventional glass image portion. The steel, Sealmet HC-1, is a 30 pct chromium steel with an expansion coefficient equal to that of glass. It has been used for some time for glass to metal seals.

► Rigid f.o.b. mill selling has imposed definite limitations on those mills who are reputed to now own a local monopoly. At present, Flint, Mich. does not fall in the geographic market area of Detroit cold rolled sheet makers--it's Cleveland territory.

► Rumors come of a softening in the automobile market. But while car makers insist that there is no softness there, if a break does occur, it is expected that production will be continued at peak rates until a complete plant shutdown becomes necessary. When and if an auto plant shutdown is ordered, it will come quickly and the duration is likely to be relatively long.

► Expansion of wholesale and retail outlets is slackening off. Around 70,000 new wholesalers and 590,000 new retailers went into business in the first 2 years after the war. Capital for such enterprises is now less plentiful.

► Dr. Joliot-Curie, French High Commissioner for Atomic Energy, was largely responsible for construction of France's new atomic pile at Fort de Chatillon to the south of Paris. This is a notable scientific event. But, it has even a greater political significance. Dr. Joliot-Curie is politically a communist. What bothers some sources is that as Russia works on atomic energy herself, availability of French results through the French Communist party would probably provide a valuable supplement. This is especially true since France will soon have at her disposal a good many results that are top secret in Britain and the United States.

► Venezuela is slated to become a steel producer by the middle of this year. Combined American and Venezuelan interests have already put up the capital and bought used American equipment which is now on its way to Curacas. Electric furnace steel will be poured into 5 in. ingots which in turn are to be rolled into concrete reinforcing bars. Output is expected to run about 500 tons monthly.



FIG. 1—Aluminum sheet being fed from coils into the coating machine which handles flat sheet or coils, widths up to 48 in. at speeds up to 5 fpm.

○ ○ ○

Prime Coating

The preparation of aluminum surfaces for paints and other finishes has always presented something of a problem to aluminum fabricators. One solution to the problem, a wash primer containing a vinyl-butyral resin pigmented with zinc chromate, in use at Permanente Metals Corp., is described by the author and the technique used in coating sheet and coils is discussed. The coating is not disturbed by subsequent light drawing and forming and gives effective protection from corrosion.

THE proper preparation of aluminum surfaces for painting and other finish coatings is one of the practical problems of aluminum fabrication which has received considerable attention during the last few years. Techniques and processes ranging from light etching, grit and sand blast roughening, the use of special

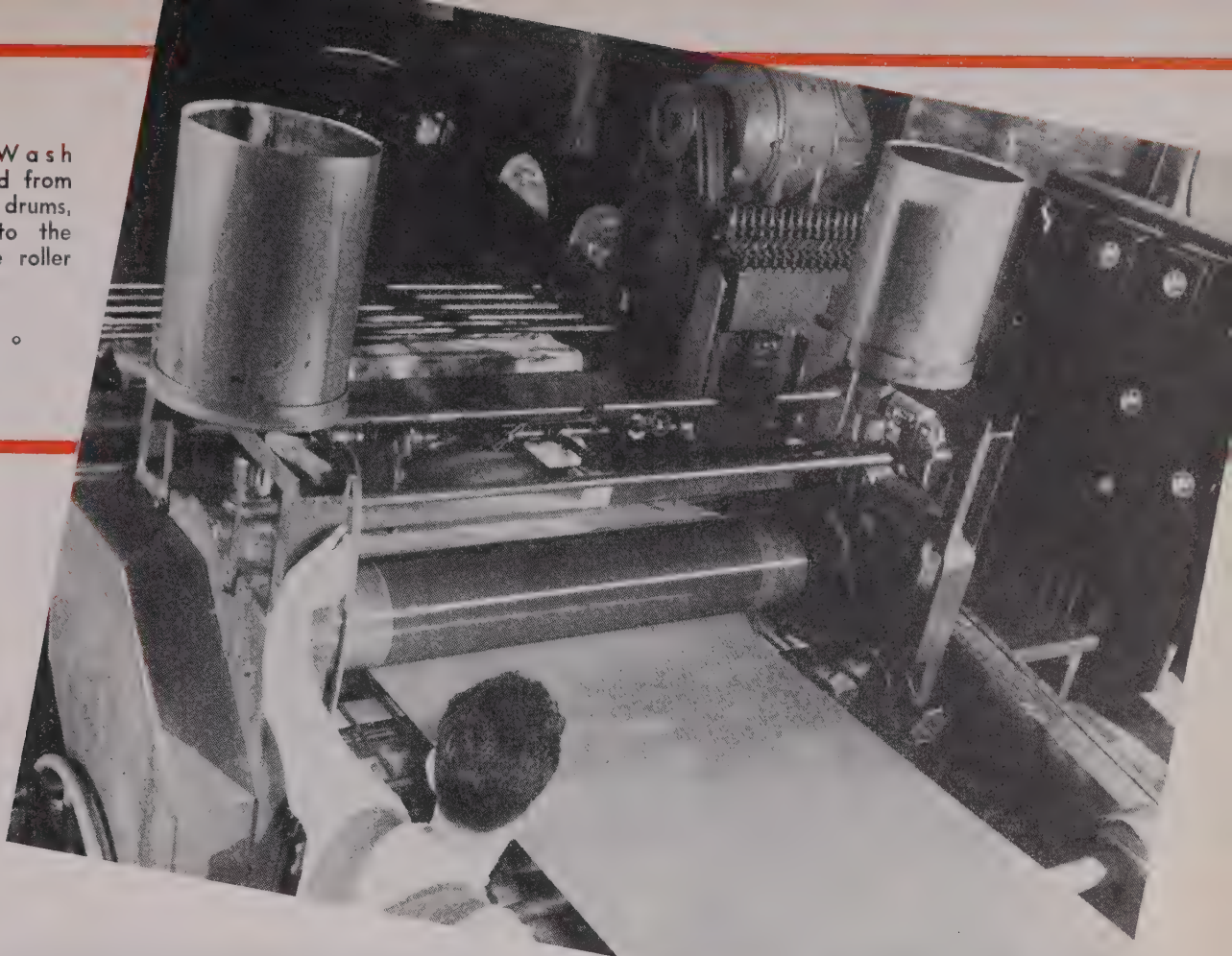
solutions for cleaning, and special primers and paints have been used with varying degrees of success.

The particular wash primer adopted by Permanente Metals Corp. for use on the Kaiser aluminum clapboard siding is WP-1, a wartime development of the Bakelite Corp. The treatment provides excellent adhesion for most paints and coatings and is effective in resisting corrosion. The application has, in fact, proved so satisfactory that Permanente now produces prime coated sheet for general distribution.

Chemically, the primer is a formulation of vinyl-butyral resin pigmented with zinc chromate, and thinned with a solution of isopropyl alcohol, butyl alcohol and phosphoric acid. After thinning the primer should be used within 8 to 12 hr, as the reaction of the phosphoric acid with the vinyl-butyral resin causes permanent gelation after that period.

The wash primer can be applied by spray,

FIG. 2 — Wash primer, fed from the storage drums, is applied to the sheet by the roller coater.



Aluminum Sheet

brush, dip, swab or roller and dries to a thin tough film. After application and under a recommended heat of 350° to 400°F, the phosphoric acid and alcohol react to form water which dilutes the remaining acid. The diluted acid reacts with the metal to form aluminum phosphate, giving the metal a light etch and providing an excellent bond for the primer.

Heats of the above intensity need to be attained for only an instant. Less intense temperatures will give satisfactory results if the heating period is extended or if the sheet is coiled or stacked immediately so that its heat will be retained for a short period of time.

In applying the primer, Permanente uses a roller coating method, figs. 1 and 2, integrated into a continuous process which will handle either flat sheet or coils, in widths up to 48 in., at speeds up to 50 fpm.

The equipment includes an hydraulic cone-type unwind reel, a heavy rewind reel equipped with a coil stripper, a series of leveling rolls, a roll

By CLYDE ST. JOHN

*Metallurgical Engineer,
Permanente Metals Corp.,
Trentwood Rolling Mill,
Spokane, Wash.*

coater, approximately 60 ft of conveyer, and a bank of infrared lamps set in gold plated reflectors. The leveler, roll coater and conveyer table are driven by a single variable-speed motor.

In the process, the coiled sheet passes through the leveling rolls, fig. 1, and then through the roll coater, fig. 2. If flat sheet is being run, the leveling process is omitted and the sheet travels directly to the roll coater which is made up of a series of resilient rubber rolls with a doctor



LEFT

FIG. 3—The prime coated sheet, moving on rollers under a 54-ft bank of 1000-w infrared lamps, is dried in less than a minute.

o o o

BELOW

FIG. 4—Strips of the prime coated aluminum being fed into the machines which produce clap-board siding.



FIG. 5 — Cutoff blades in the machines forming the siding are actuated by a photoelectric eye.



roll adjacent to the top roll to provide a reservoir for the primer and distribute it to the work rolls. Thickness of the primer is controlled by regulating the pressure of the resilient rolls and by adjusting the setting of the doctor roll.

The coated sheet passes, on the roller conveyer, under a 54-ft bank of 1000-w infrared lamps, fig. 3. The lamps produce the required heat in less than one min. The additional heat required for sheet of heavier gages is obtained by reducing the speed of travel.

At the end of the infrared bank the coiled sheet is rewound or the flat sheet is removed from the conveyer and stacked. Only one surface of the sheet is coated and a repass is necessary where coating on both sides is required.

Sheet used in this process must be relatively free from oil. As a precaution against oil and dust or dirt particles the sheet can be passed through a cloth buffer, fig. 1, before it is fed into the leveling rolls or it may be degreased in conventional solvents.

Weatherometer, salt spray, immersion and other corrosion tests, conducted by Bakelite, Permanente and other companies, have shown

the primer to offer good corrosion protection in most natural and artificial environments. Other tests indicate that the coating is less soluble and exhibits less pinpoint blistering than the commonly used zinc chromate primers.

The prime coated sheet is not harmed by light drawing, forming or stretch forming and some alloys can be given as much as a 180° bend without damage to the surface. Fairly severe roll forming is used in the fabrication of the clap-board siding, figs. 4 and 5, and in other cases the metal has been elongated as much as 2½ pct without damage to the primed surface.

There would be no advantage in using prime coated material for applications where joining is accomplished by fusion welding, resistance welding or brazing. However, it is suitable for riveted structures, such as truck or bus bodies, and for many building material items, signs, cabinets and other products.

The primed sheet requires no other preparation for finish painting. Care must be taken during fabrication, however, to keep the sheet free from dirt and oil. Where this is not possible, the sheet can be cleaned with mineral spirits or high flash naphtha.

Driving and Controlling

A Modern

In a 600-fpm strip pickling line, involving operations such as welding and flash trimming for which the strip must be stopped, maintenance of a continuous constant speed through the pickling zone becomes a difficult proposition. The author discusses the manner in which three separate adjustable-voltage drives, with acceleration and retardation automatically handled by a Rototrol system, are used in the new line at the Aliquippa plant of Jones & Laughlin Steel Corp.

ONE of the most modern strip pickling lines yet to be installed was recently placed in operation at the Aliquippa plant of the Jones and Laughlin Steel Corp. The line was designed on the basis of continuously pickling hot-rolled strip at a speed in excess of 400 fpm to meet the ultimate rated capacity of 50,000 net tons per month. Coils of hot-rolled strip weighing from 6000 to 7000 lb are fed into the line and emerge as 30,000 lb coils for cold reduction in the five-stand tandem mill.

The line, shown schematically in fig. 1, is physically divided into two sections separated by the looping pit. The adjustable-voltage drive is divided into three sections to provide continuous operation through the pickling zone.

Hot-rolled coils are placed on the entry feed conveyer and are passed to the transfer conveyer. During transfer to the entry end of the pickling line, the individual coils are weighed. The conveyers are interlocked with the scale and with each other so that each coil proceeds at a regular interval making it impossible for more than one coil to occupy a given space in the conveyer system at the same time.

As each coil leaves the conveyer system, it enters the pickling line by being placed on the mandrel of the uncoiler. The strip is fed through the processor, to break the scale, and then on to an upcut shear where the front end is cropped to insure a square end for welding.

When the strip reaches the flash welder, the front edge is welded to the rear edge of the preceding coil in a semiautomatic cycle. At the completion of the welding cycle, the strip passes to a trimmer which removes the flash resulting from upsetting of the weld. From the flash trimmer, the strip proceeds to the No. 1 pinch roll and then into the looping pit which provides storage for the strip until it enters the pickling zone of the line.

Strip is taken from the looping pit by the No. 2 pinch roll and fed into the processing tanks where it is washed and pickled, after which it passes through the No. 3 pinch roll. Upon leaving this roll, the strip is dried and passed to the second upcut shear, which separates the continuous strip again into coil lengths, and then to the side trimmer where the edges are trimmed. After trimming, the strip is passed through oiling rolls and finally into the upcoiler where it is recoiled for further processing in the five-stand tandem mill.

Upon being ejected from the upcoiler, the coils travel along a similar system of conveyers and scales to those traversed prior to entering the line. This delivery conveyor system is also interlocked to prevent coil jams.

As four or five hot-rolled coils are required to produce one coil suitable for cold-rolling in the tandem mill, it is apparent that the entry end of the pickling line must run considerably faster

Strip Pickling Line

By J. RAYMOND ERBE

Industry Engineering Dept.,
Westinghouse Electric Corp.,
East Pittsburgh

than the remainder of the line. For this reason, as shown in fig. 1, the entry end of the line was designed to operate at 1400 fpm.

Since the degree of pickling obtained is primarily dependent upon the length of time that the strip remains in the pickling solution, it be-

comes necessary to operate the pickling zone at constant speed, and consequently constant pickling time, to prevent either over or under pickling of the strip.

The size of the looping pit between the entry and delivery sections of the line, if continuous

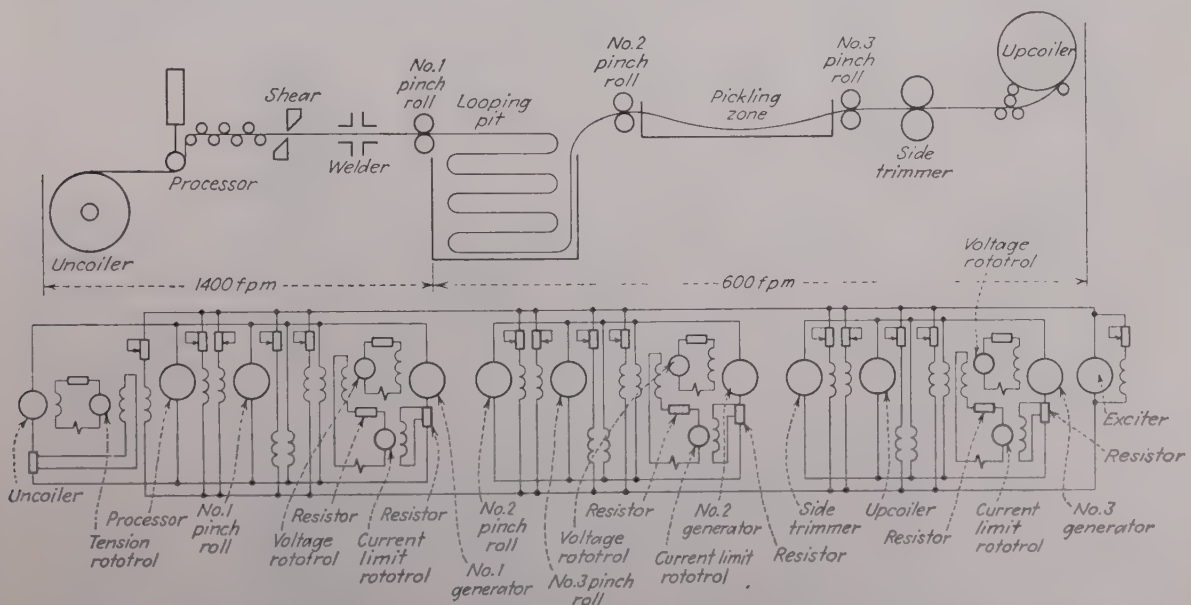


FIG. 1—Simplified schematic arrangement of the pickling line, with adjustable-voltage drive system, recently put into operation at the Aliquippa plant of Jones & Laughlin.

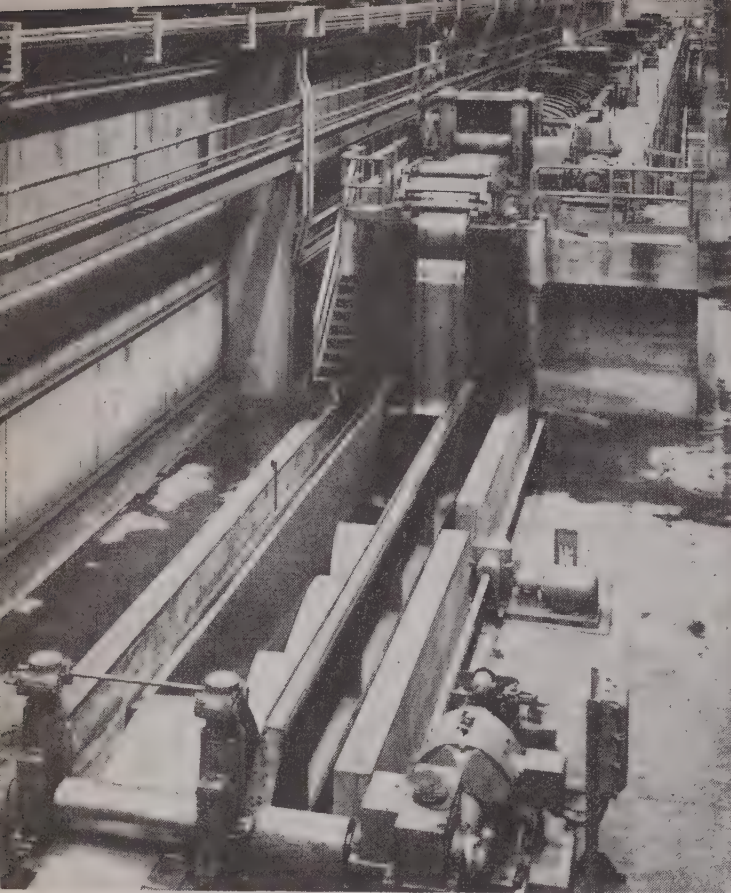


FIG. 2—Strip entering the looping pit from the No. 1 pinch roll. In the rear at the upper level is the No. 2 pinch roll and, beyond it, the pickling tank section.

pickling is to be realized, is determined by the speed of the delivery end of the line, the size of the hot-rolled coils and consequently the number of welds which have to be made, the length of time required in making a weld, the time required in trimming the weld, and the speed of the entry end of the line. In order to keep the physical size of the looping pit reasonably small, several features were incorporated in the design of this line. A general view of the line looking over the looping pit toward the delivery end is shown in fig. 2.

One of the features for insuring continuous operation was to make acceleration and retardation automatic by using a Rototrol rotating voltage-maintaining and current-limiting regulator. With this method of control, each section of the adjustable-voltage drive is accelerated at the maximum rate permissible with good operating practice, by forcing the generator voltage so as to maintain a definite accelerating current until the preset voltage corresponding to the desired running speed is reached. The Rototrol regulator then maintains this running speed. The line is stopped in the minimum time by current limit control. With this system, the entry end of the line is accelerated to a running speed of 1400 fpm in about 3.5 sec and is stopped in about 2.5 sec. This cycle is consistently duplicated with a high degree of accuracy thus reducing the down time of the entry end of the line to a minimum. Such accurate retardation control permits very precise positioning of the strip in stopping and reduces the jogging required to position the weld under the flash trimmer, thereby further eliminating down time or nonproductive time in this section of the line.

Another feature that reduces down time of

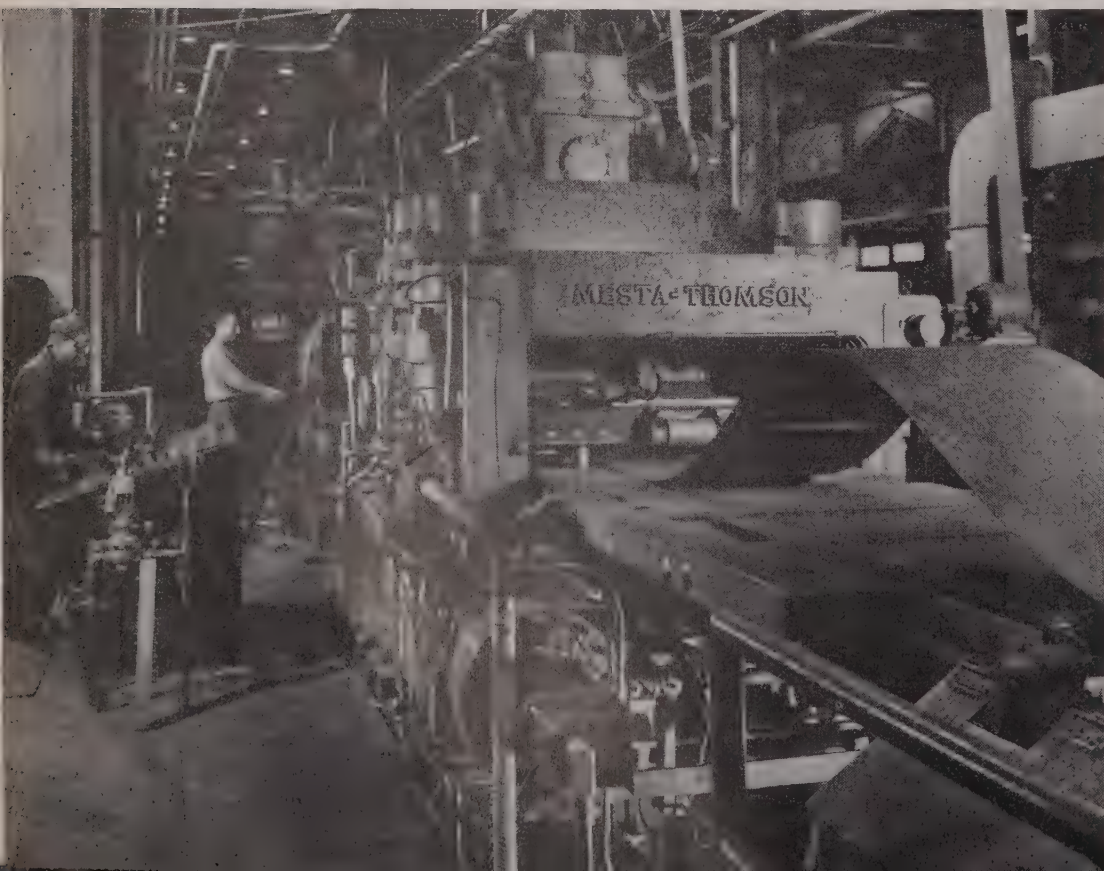


FIG. 3 — Strip being welded at the flash welder. Head of the welder, in the foreground, moves toward the stationary head as welding progresses.

the entry end is the semiautomatic operation of the flash welder, shown in fig. 3. By the use of proper control and interlocking, the cycle of operation at the welder is as follows: With the welder set for strip runout, the gage head is up, the clamp is open, the movable head is back for gage clearance, and the sideguards are open. The welder heat, feed, and gap settings are made from the welding set-up chart.

The tail end of the leading strip is sheared and squared at the No. 1 upcut shear. It is then ad-

movable heads are closed to center the strip, the upper heads are lowered to clamp the strip and the sideguards are opened. The operator inspects the welder for satisfactory positioning of the strip in the dies and throws the switch. The remaining cycle becomes automatic.

Throwing the switch raises the gage to the top position where the welding power is applied, the gap between the strip ends is closed and the flashing cycle is initiated automatically. During the flashing cycle, the movable head con-

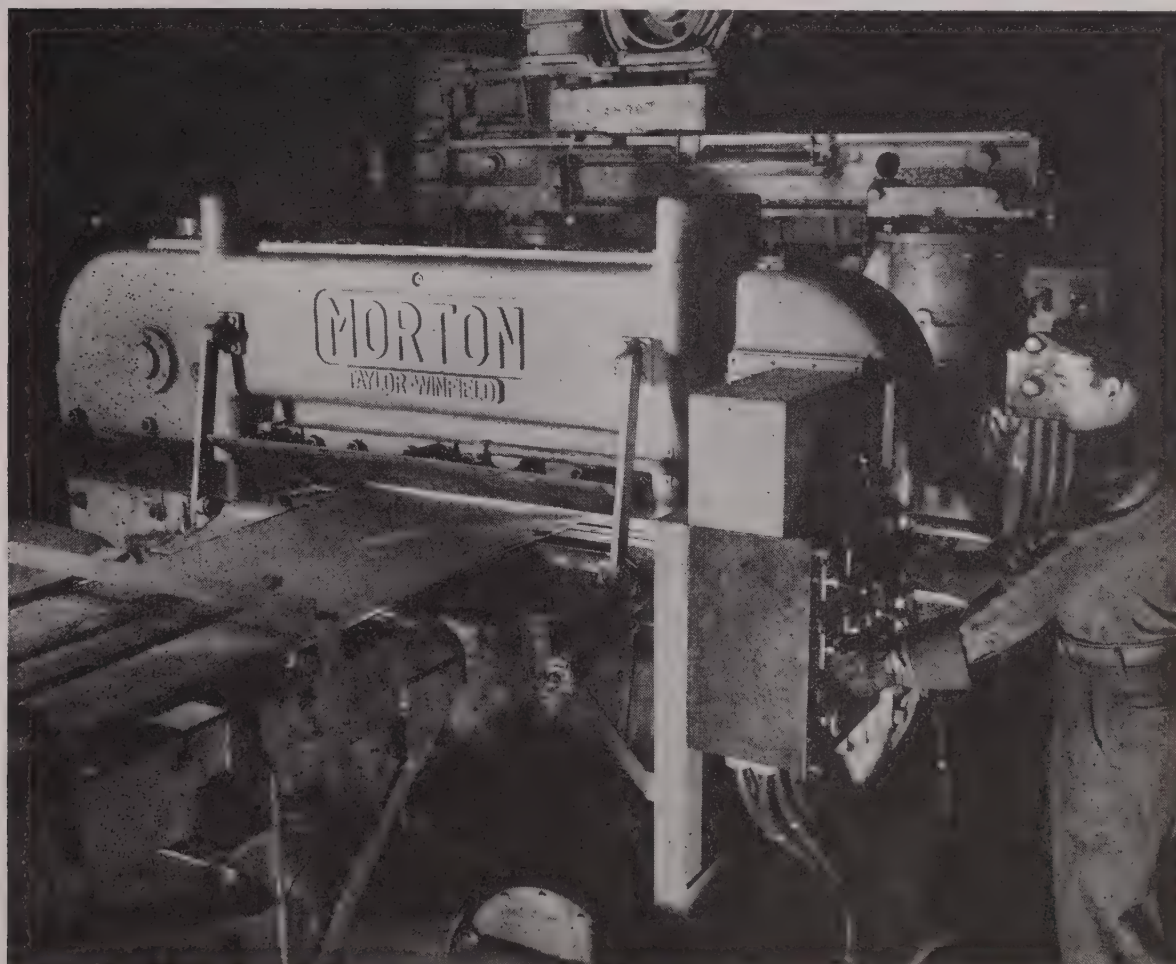


FIG. 4—Trimmer for removing the flash caused by the upset of the weld.

vanced beyond the welder dies and stopped. The gage is lowered to clean the die and then automatically raises to the gage position established by the cam limit switch selector where it automatically stops. The tail end of the leading strip is then jogged back against the gage.

The leading end of the entering strip is sheared at the No. 1 upcut shear and is advanced to the gage head. At this time, the operator raises the looping roller ahead of the flash welder and additional material is fed from the processor. After a loop has been established in the strip ahead of the flash welder the looping roller is lowered and the loop forces the end of the strip against the gage. Since it is a free loop, the edge of the strip aligns itself against the gage.

The sideguards on both the stationary and

tinually advances toward the stationary head until at a predetermined position the upset occurs with the movable head applying an upsetting blow of 12,000 psi maximum to forge the strip.

When the upset is completed, the welding power is cut off, the clamps released and the movable head returned to the original starting position.

Due to the increased speed of the welder itself, it was considered desirable to use ignitron rectifier contactors instead of the conventional magnetic contactor for applying the welding power. These ignitron tubes are used in a back-to-back arrangement so that each tube conducts current during alternate half cycles to supply continuous power to the weld.

The use of ignitron contactors makes it pos-

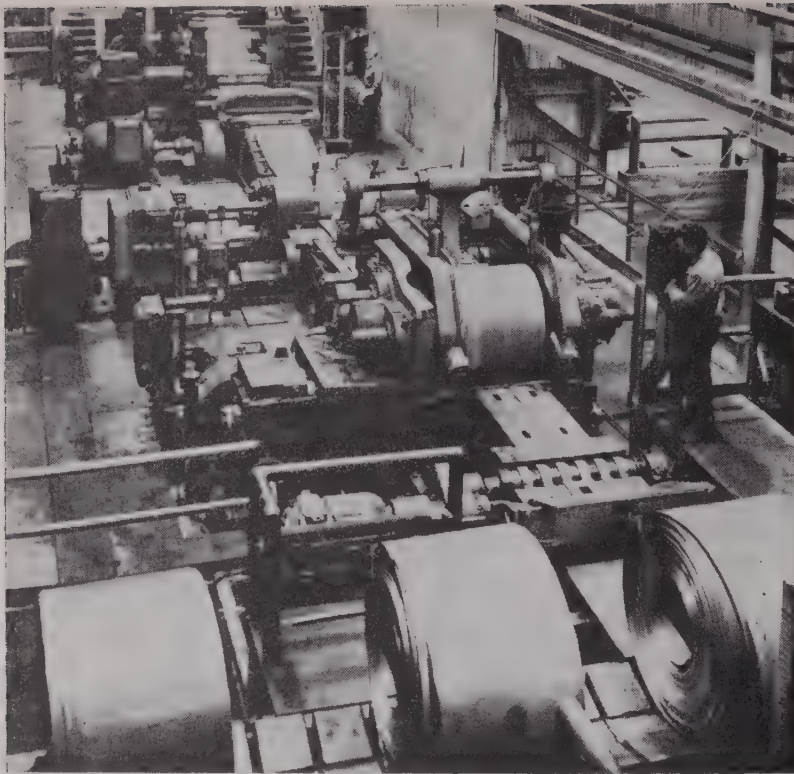


FIG. 5—Delivery end of the line. Coils in the foreground are on the exit transfer conveyer.

sible to adjust the power by means of heat control so that the welding current is accurately regulated throughout the welding cycle and a uniform heat is obtained. In addition, it is possible to accurately control the duration of the cycle through the use of a synchronous timer. In this way, each welding cycle can be initiated, the current regulated and the length of the cycle controlled so that successive welding cycles accurately duplicate each other. Consequently, when an optimum cycle has been established for any material, it can consistently be repeated.

As no mechanical moving parts are required in the controls, there is no problem of mechanical inertia and a faster operation is obtained.

A further aid in reducing the down time of the entry end of the pickling line was to make the flash trimmer cycle semiautomatic. Fig. 4 shows the trimmer that removes the flash caused by the upset of the weld. The control for the flash welder was arranged to provide the following cycle:

After welding, the strip is jogged so the flash is positioned in the trimmer. The flash trimmer is moved longitudinally along the strip to position the cutting head over the weld. Once positioned, the strip is clamped securely on both sides of the weld, the cutting head traverses across the strip removing the flash, the clamp opens, the cutting head returns, and the trimmer automatically returns to its original position.

The delivery end of the pickling line is divided into two adjustable-voltage sections as shown in fig. 1. This was done so the pickling zone could be operated at constant speed while the upcoiler was stopped to eject a completed coil.

The sequence of operations for the two sections is arranged so that when it is desired to shear the strip, at the completion of a coil, the operator depresses a "slow run" pushbutton and the speed of the delivery end of the line is reduced to a preset slow speed. The strip continues at this slow speed until the point of cut reaches the shear. The shear pushbutton is depressed, the shear makes one cycle and stops automatically. With this, the third section of the line accelerates automatically, driving the upcoiler to the running speed.

The final section then continues to run at normal speed until stopped to eject the coil. After the coil has been ejected, the "run" pushbutton is depressed and both sections of the delivery end, fig. 5, automatically return to the normal running speed.

The complexity of the line is indicated by the electrical requirements. There are 15 dc motors totaling 979 hp; 1100 kw of generating capacity driven by 1490 hp of motor capacity; 30 ac motors totaling 687 hp; and one 667-kva welding power transformer. This means that a total load of approximately 3100 hp is connected to the ac power system operating the line.

Heliarc Welding Automobile Fenders

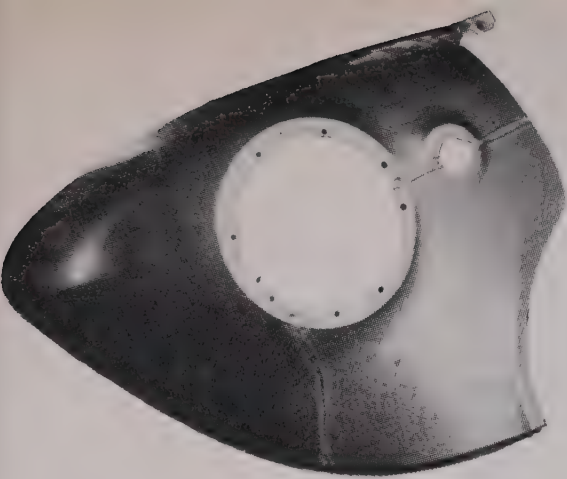


FIG. 1—The welds in the Futuramic fender radiate from the headlamp opening and are nearly flush with adjacent surfaces.

Producing beads that require little dressing and doing a job not considered feasible for flash welding, inert gas shielded arc welding is being used to weld together two stampings that make up the front fender of the new Futuramic Oldsmobile. Filler metal is used where fitting is poor, but the bulk of the welding is with tungsten electrodes. Loading, welding and unloading requires about 1½ min.

By HERBERT CHASE

New York

OLDSMOBILE fenders have long been welded by flash methods. With the advent of the Futuramic design of front fenders, however, Olds methods specialists believed that the two short welds, shown in fig. 1, radiating from the headlight opening would not be feasible by flash welding or, at least, could be done to better overall advantage with Heliarc equipment.

For this reason, Heliarc setups were designed and are in successful use. The operation is slower than flash welding, had it been feasible, but smoother welds result and less dressing is required to produce the smooth contours necessary at the joints where exposed surfaces that receive a glossy finish are involved. Also, burning through that occasionally occurs in flash welding, can be avoided if welders exercise reasonable care. No pounding, as is often required

for flash welding, is needed because distortion is avoided.

Although the mild steel sheet welded ranges in thickness only 0.035 to 0.042 in., excellent arc welds are produced. Any difference in cost that slower welding entails is offset at least in part by reduced grinding time and low welding fixture tooling costs. Torches are guided entirely by hand, hence the only fixture needed is one that holds the stamped parts in position.

The larger stamping is the fender body and has to be positioned on end to bring the joints in suitable welding position. The welders work on platforms, one sitting and one standing, as shown in fig. 2. These work stations are at the sides of a light air-operated fixture that clamps the stampings. Edges to be welded are square and are clamped over copper backing strips that

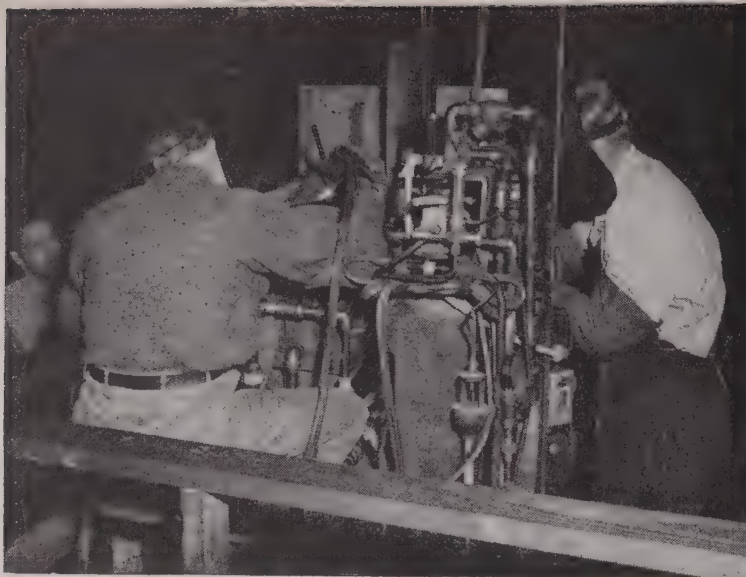


FIG. 2—This setup is used for simultaneously making two Heliarc welds that join a pair of fender stampings while the parts are clamped in an air-operated fixture.

have the required contour. There are separate fixtures for the right and left fenders and two welders work at each fixture.

Although edges of stampings are trimmed and are supposed to match when clamped, as shown in fig. 3, slight irregularities often occur. Hence edges do not always butt perfectly throughout their length. For this reason, an uncoated filler rod of mild steel is used at points where there is a significant space between the edges to be welded. If all edges at joints made contact throughout their length, no rod would be needed,

FIG. 3—One weld is made along the joint that runs from the headlamp opening through a boss hole to the edge of the fender. The second joint is hidden behind the crown of the stamping at the left.



as no bead above the joint is wanted and the metal from the edges of the stampings should fuse and remain level with the sheet faces.

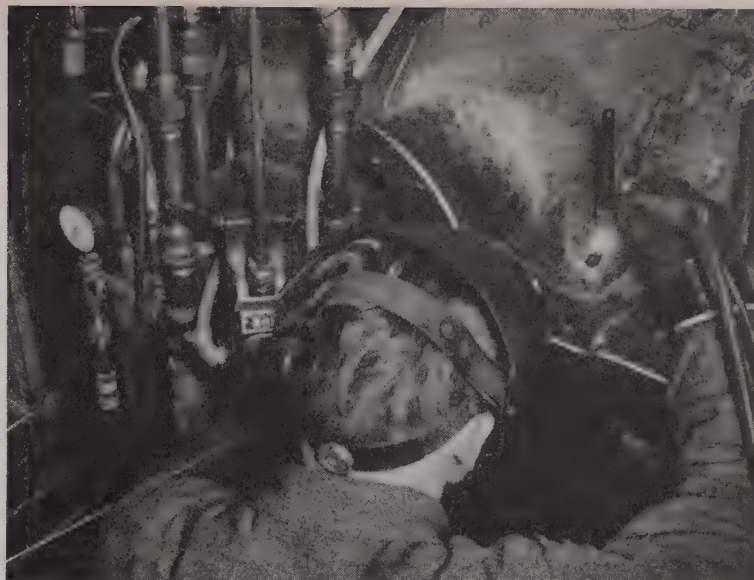
No solvent is applied in preparing the edges to be welded as the stampings are relatively clean when received. A cloth is run along sheared edges and adjacent faces, however, before the stampings are clamped in the fixture. One joint is about 10 in. long, extending along a concave surface from the headlamp hole to the edge of the fender. The second weld has less curve but is interrupted by a small hole around which is a raised boss. Fig. 1, showing a fender after welding but before the welds are dressed off flush, shows this interrupted weld. The total length of the weld along this joint is about 6 in.

A standard water cooled Linde Heliarc torch, with Argon arc shielding, makes unnecessary the use of a flux; prevents spatter and oxide inclusions; and yields an excellent weld that is comparatively smooth and substantially level with adjoining faces. The concentrated heat makes for faster welding than with an open arc and leaves no flash or flux on surfaces. It requires about $1\frac{1}{2}$ min per fender to make the pair of welds. This includes loading and unloading time; and the time of two welders plus a helper who loads the stampings and unloads the finished fender.

A carbon rod is used to start the arc. Welders then work from the headlight opening, at the high point in the fixture, downward toward themselves, as shown in fig. 4. A filler rod is used when needed at points where edges to be joined are not close enough together and a tungsten electrode is used where filler metal is spot welded. Welding is done through a slot in the clamping fixture that covers adjacent areas of the stampings.

Argon shielding gas is fed from the battery of cylinders, the gas flowing through a manifold, suitable reducing valves and piping to control units, shown in fig. 2, and thence through a flexible tubing to the torch. An average of about

FIG. 4—This welding operation is nearing completion. The weld is made through a slot in the clamping fixture that covers the welding area. Argon is the shielding gas for the arc.



240 fenders are welded per tank of Argon. This is equivalent to about 1 cu ft of gas, at atmospheric pressure, per pair of welds.

For each press setup of two torches, there are two welding generators, one General Electric and one P & H, each of 300 amp capacity and the actual welding current per torch is 150 amp. Generators are employed in combination with Weldtronic control equipment.

After welding, fenders are transferred to storage and then to a finishing department where grinding disks driven at high speed are employed to grind smooth the welds and adjacent surfaces. Disks of 50 grit are used for roughing and 120-grit wheels make finishing passes. Relatively little metal has to be removed, as there is no flash or warpage and the welds are nearly flush with adjacent surfaces.

... NEW BOOKS ...

"Jigs and Fixtures," by F. H. Colvin and L. L. Haas. Practical aspects of design, construction and use of jigs and fixtures in machine shop practice are taken up by type of operation and described and illustrated in this revised edition. Elements in jig and fixture design; standard parts for jigs and fixtures; welded, cast iron and aluminum fixtures; various clamping and holding methods; and inspection techniques are discussed. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. \$4.50. 410 p.

"Gas Welding and Cutting," by C. G. Bainbridge. Practical information covering most of the applications of gas welding and cutting is the purpose of this volume. It is a book for the practical welder and for those responsible for gas welding and cutting operations involved the manufacture, repair and maintenance of metal parts and the installation of piping and other equipment. Essential and instructive illustrations of technique and methods are included. Louis Cassier Co., Ltd., Dorset House, Stamford St., London, S. E. 1. 15 shillings plus postage. 305 p.

"Theoretical Structural Metallurgy," by A. H. Cottrell. New ideas and concepts in atomic mechanics have been applied to phenomena of metals and alloys in this book. Selection of topics is centered around the electron theory of metals and the statistical thermodynamics of metals and alloys. Longmans, Green & Co., Inc., 55 Fifth Ave., New York. \$5.25. 256 p.

"Small Business: Its Place and Problems," by A. D. H. Kaplan. This book, a research study of the Committee for Economic Development, analyzes causes of the high turnover in small-scale enterprise, the problems facing small business, and the private and public policies that can help strengthen it. Statistics on relative efficiency, profit comparisons and other information is included. McGraw-Hill Book Co., 330 W. 42nd St., New York 18. \$3.25. 281 p.

"Forming of Austenitic Chromium-Nickel Stainless Steels." Detailed descriptions of modern forming procedures for chromium-nickel stainless steels are given in this book. Bending and straight flanging, forming of curved sections and tubing, deep drawing, die forming and other methods are discussed. International Nickel Co., Inc., 67 Wall St., New York 5. \$4.00. 26 p.

Mechanization Boosts Westinghouse

MECHANIZATION of a gray iron foundry has increased casting capacity from 40,000 to 60,000 lb and at the same time reduced the amount of material manually handled per day by its 75 employees from 1470 to 294 tons for the single shift. This is the foundry of Westinghouse Electric Co., East Springfield, Mass., which was originally built in 1937 and designed for high production of highly repetitive small castings with an average weight of 5 lb which are components of electrical appliances. The foundry was recently redesigned to make the fullest use of mechanized equipment to increase operational efficiency and improve working conditions.

Two basic types of gray iron castings are produced here; motor housing castings which weigh up to 40 lb and are produced on jolt-squeeze roller type machines and the smaller castings, making up the bulk of the work and averaging

about 3 lb, which are molded on small automatic machines.

Representative of the degree to which mechanization has been carried out are the facilities for producing and handling the smaller castings, including the three-decker conveyer system which cut floor space requirements by 50 pct. This sequence of operations begins with the molder picking up the empty aluminum cope from waist-high position on the top tier of the three-deck gravity roller conveyer illustrated in fig. 1, and placing it over the pattern on a Osborn molding machine.

The operator then positions the empty aluminum drag next to the cope. This automatic molding machine is large enough to accommodate both cope and drag pattern. Cope and drag are filled with sand from an overhead hopper with air-operated gate, as shown in fig. 2. The machine then jogs cope and drag, scrapes off excess sand,



FIG. 1 — Three tier gravity roller conveyer employed to transfer molds from molding machine to shakeout. Molds are poured on outgoing bottom two tiers and empty flasks returned on top tier.

Foundry Capacity

By A. D. STOUT, JR.

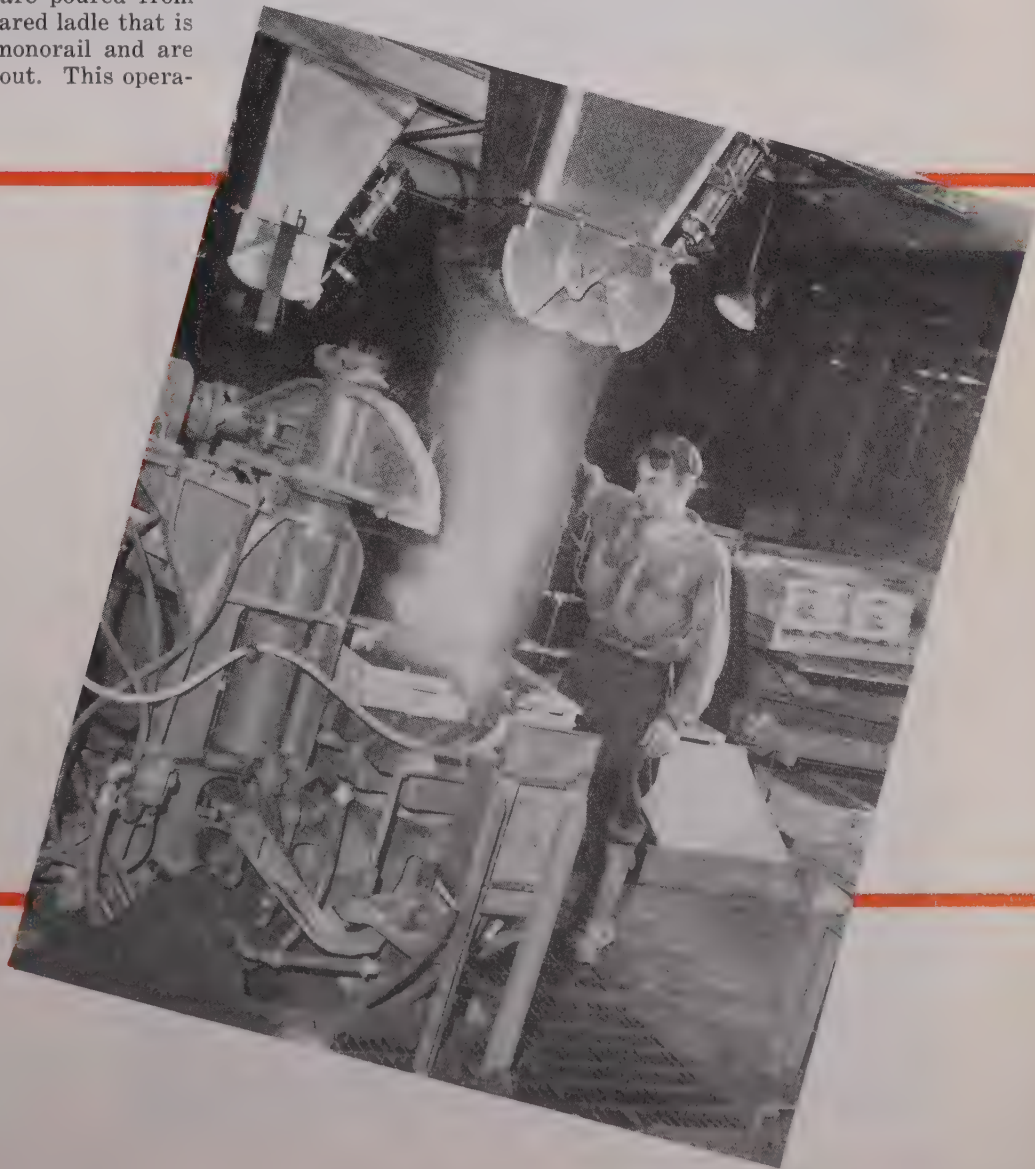
Associate Editor,
THE IRON AGE

squeezes, vibrates and strips the pattern, all in one automatically sequenced cycle. Excess sand drops through subway grating over which molding machine is placed, as illustrated in fig. 2. An under-the-floor system of conveyer belts returns the excess sand to the storage bin.

The molder then removes the drag from the molding machine and places it on an out-going deck of the conveyer, after which the cores are set. Drag is turned over on a spring hinge as it is removed from the molding machine and the cope is removed from the molding machine and placed on the drag. Outgoing molds placed on one of the two lower decks of the conveyer are started down the roller conveyer that constitutes the pouring line by an air-actuated piston rod. Molds are poured from a 500-lb capacity geared ladle that is suspended from a monorail and are gravity fed to shakeout. This opera-

An increase of 50 pct in casting capacity and a reduction from 1470 to 294 tons in the amount of material handled manually each day were some of the results of a recently completed mechanization program at the Westinghouse East Springfield foundry. Based largely on effective use of modern material handling techniques, the program also resulted in greatly improved working conditions.

FIG. 2 — Automatic molding machine accommodates both cope and drag patterns. Cope and drag are filled from overhead hopper with air-operated gate. Molds are produced in a automatically sequenced cycle.





o o o

ABOVE

FIG. 3—Molds are poured from 500-lb capacity geared ladle suspended from a monorail and are gravity fed to shakeout. Air-operated clamping plates are used during pouring.

o o o

LEFT

FIG. 4—A mold is shown here being moved to shakeout, which is located under the floor. Air-operated device ejects and empties mold, returning it to top tier where it is gravity fed back to molding machine.

o o o



tion is shown in fig. 3. Air-operated clamping plates hold cope down on drag during pouring. These plates are controlled from one point.

After molds have been poured, they are moved into the shakeout as new molds are placed on the roller conveyer and pushed to pouring position. Operation of shakeout is unique. An air-operated device ejects and empties the mold which rolls into a basket that is supported on trunnions slightly off center. This is located under the floor at the end of roller conveyer. A mold about to be dropped is shown in fig. 4. The weight of the mold turns the basket over with sufficient velocity so that hot sand and castings are discharged onto an oscillating conveyer below when the basket hits a stop. An air-actuated piston rod automatically raises the basket vertically to the return conveyer, righting the basket as it

does this, and unloading flask onto the top tier of the roller conveyer. Flasks are then gravity fed back to the molding machine.

As the flasks have grids in the drag to keep the sand in the flask, bottom boards are not used. After sand and castings have been discharged from shakeout the oscillating under-the-floor conveyer carries both to a perforated vibrating shakeout where the sand and castings are separated. Sand is cleaned and screened and returned to storage bin. Castings are carried out around outside of building on a conveyer and are returned inside the building in an area adjacent to to cupola charging operations. This outside conveyer serves a three-fold purpose; to give hot castings an opportunity to cool, to keep the heat of castings out of the building while cooling, and to convey castings to the sorting operation.

Vitreous Enamels for Aluminum

DEVELOPMENT of vitreous enamel coatings for aluminum, which in comparison with vitreous coatings for steel have the advantage of superior impact and flex resistance, has been announced by E. I. duPont de Nemours & Co., Inc., Wilmington, Del. The coatings also have excellent resistance to thermal shock and exposure of the base metal does not produce unsightly rust streaks.

At the present time, enameling only of wrought 61-S alloy and of nonporous castings of 43 alloy is recommended. However, research is being carried out toward the development of materials and techniques for other alloys and for commercially pure aluminum.

Application of the development was delayed by enamel spalling on exposure to water and weather. On the basis of accelerated spalling tests, however, it is believed that an improved metal pretreatment has corrected this deficiency.

Recommended pretreatment, to give a surface free of grease, oil and oxide, involves an acid bath cleaning—or vapor degreasing for bright sheet stock which is not heavily oxidized—followed by a special bath treatment. The treating bath composition is 0.2 pct $\text{Cr}_2(\text{SO}_4)_3$, 3.8 pct NaOH , 19.0 pct K_2CrO_4 , and 77 pct H_2O . For 43 alloy, the bath is maintained at $104^\circ\text{F} \pm 5^\circ$ and work is treated for 6 to 8 min. For 61-S alloy, the bath is heated to $120^\circ \pm 5^\circ$ and the work is treated for 3 to 5 min. Prompt washing for removal of treating solution is essential.

DuPont is supplying coarse fruits, pigments and a mill addition agent to be mixed and wet milled by the enameler. The formulas give cover coats resistant to the action of mild acids. Ground coats, however, are not acid resistant. Pigmenting of ground coats is not usually recommended as it may cause spalling, although a small amount

of pigment is used in the ground coat of whites to improve reflectance in the cover coat.

In general, any surface that can be easily reached with a spray gun can be enameled. In areas difficult to reach, slip usually results with consequent enamel tearing. Corners and edges should be rounded to a radius of not less than 1/32 in. and thin, nonrigid sections should be enameled on both sides to prevent warpage. Sand holes in castings fill poorly and porosity often results in local spalling. The base aluminum stock should not be anodized or previously treated with strong corrosion-inhibitive agents or cleaners. Enameling has been successfully carried out on welded seams joined with 1100°F Airco welding rod.

In the enameling procedure, the stock is pre-fired at 970° to 1000°F for a minimum of 5 min. After cooling, a thin ground coat is sprayed on, from 15 to 20 g per sq ft being recommended. The stock is then given a low temperature drying to prevent dust pick-up and is again fired at 970° to 1000°F for a minimum of 5 min. After cooling to room temperature, the ground coat is applied. One sprayed coat, from 40 to 70 g per sq ft, will usually suffice. If tearing is encountered two lighter cover coats, separately fired, are suggested. Final firing is done under the same conditions as the previous two firings.

Degree of temper of the metal appears to be no factor in enamel properties, although softer tempers are more generally suited to forming operations. High lead contents of the frits used necessitates care in handling to avoid industrial health hazards and also prevents application to surfaces which may come into contact with foods.

Commercial applications developed thus far include the enameling of aluminum for store fronts, advertising displays and bathroom sanitary ware.

Melting and

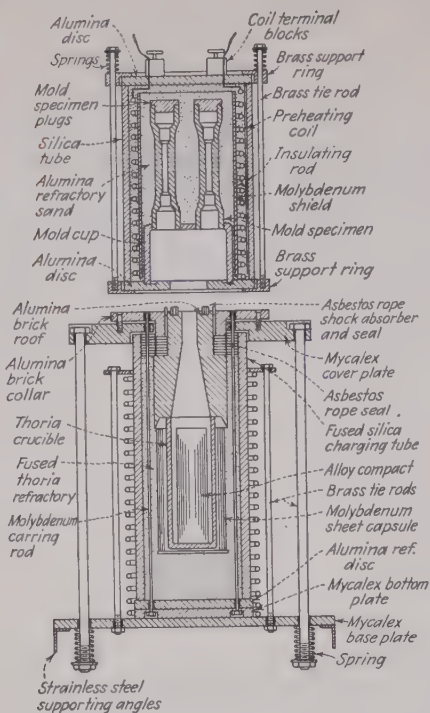


FIG. 1—Sketch shows crucible assembly and mold setup for vacuum casting furnace employed in melting titanium and titanium alloys.

MELTING and casting of titanium presents many difficulties, due primarily to the high melting point of the metal and to the fact that it reacts with virtually everything with which it comes in contact. Techniques can be employed to overcome these problems, but unfortunately these methods are limited to very small scale investigations and cannot be applied to large scale commercial operations. Powder metallurgy procedures can be employed, but are not considered practicable because of size limitations and prohibitive costs. It appears, therefore, that melting procedures must be developed so that the metal can be consolidated without undue contamination.

These difficulties were discussed in some detail at the titanium symposium, held recently in Washington, under the sponsorship of the Office

For additional data on the physical properties of titanium and some of its alloys, see THE IRON AGE, Dec. 23, 1948, p. 101, and Dec. 30, 1948, p. 41.—Ed.

of Naval Research. Three significant methods for melting titanium were described, and these will be briefly reviewed in this article.

Considerable research has been carried out during the past several years at Westinghouse Research Laboratories using a vacuum casting furnace, such as is shown in fig. 1¹. The refractory problem was described by P. H. Brace, consulting metallurgist at Westinghouse, as quite serious, and preliminary experiments showed that ordinary silicate-bonded bodies were out of the question. Subsequent studies were then con-

ducted with the pure oxides, Al_2O_3 , BeO and ThO_2 , with small blocks of substantially pure titanium being melted in vacuo while in contact with compacted and sintered test pieces of the respective oxides.

It was found that molten titanium would react exothermically with Al_2O_3 to produce a brittle alloy that bore no resemblance to either of the metals concerned. In the case of BeO the reaction was less vigorous and the resultant alloy, although less fragile than that resulting from the reaction of titanium and Al_2O_3 , was nevertheless quite a different substance than pure titanium. With thorium oxide, the reaction was relatively slight and the properties of the test block after melting were enough like the original material to encourage the use of this material. Best results were obtained from a dense body of high purity thorium oxide fired at quite high temperature, say 3630°F .

Some attempts were made to use graphite crucibles, but the results were very unsatisfactory and were discontinued.

The vacuum melting routine comprised, essentially, the following steps: Weighing and assembling in the crucible of the components of the charge; mounting the crucible and charge in a silica-tube container and mounting within the inductor coil; assembling the mold components; evacuation of the melting chamber; out-gassing of mold; preliminary heating and out-gassing of the charge; heating; fusion and adjustment of the temperature of the melt; and finally, casting.

During melting, the mold stood at one side leaving a clear view of the interior of the melting chamber by way of the sight window. Preparatory to casting the furnace, the casing was rotated slightly and the mold, under its own weight, swung over the furnace and by means of a spring and latch was held with its opening over the pouring nozzle and bedded against an asbestos gasket that provided a metal-tight seal between the melting chamber and mold inlet. Casting was then effected by a counter-rotation of the furnace through approximately 180° that inverted the whole arrangement and discharged the molten metal into the mold. The mold assembly comprised a casing that enclosed refractory thermal insulation, a heating element of molybdenum wire bound on an Alundum tube and within the Alundum tube granular refractory material that surrounded and supported the mold.

Casting Titanium

The induction melting of titanium metal in graphite was described by J. B. Sutton². Equipment employed in the production of 10-lb ingots, see fig. 2, consists of the graphite crucible (1) carbon black insulation (2) between the crucible and an outside silica container (3). A pipe extending from the melting crucible fits tightly into the ingot mold (4) which is graphite or water-cooled copper. One induction coil (5) surrounds the silica around the melting crucible and a second (6) is located around the pipe connecting the melting crucible to the ingot mold.

A sight glass (7) attached to a graphite pipe (8) extending through the top (9) of the melting crucible is used in observing the melting operation and making temperature measurements with an optical pyrometer. Supports (10) for the outside silica container are fastened to a

¹"Some Aspects of the Metallurgy of Titanium Alloys," P. H. Brace, Westinghouse Research Laboratories.

²"Induction Melting of Titanium Metal in Graphite," J. B. Sutton, pigments dept., E. I. du Pont de Nemours & Co.

³"Production and Arc Melting of Titanium," O. W. Simmons, C. T. Greenidge and L. W. Eastwood, Battelle Memorial Institute.

(The above papers are available from the Office of Naval Research, Navy Dept., Washington 25.)

transite top on the main furnace support (11). Argon during heat-up, melting and casting operations is introduced through inlets (12) and (13). The ingot mold is raised and lowered by means of a mechanical jack (14). High frequency power is supplied to the two coils from 20 and 5-kw Ajax spark-gap converters.

In charging the melting crucible for a 10-lb

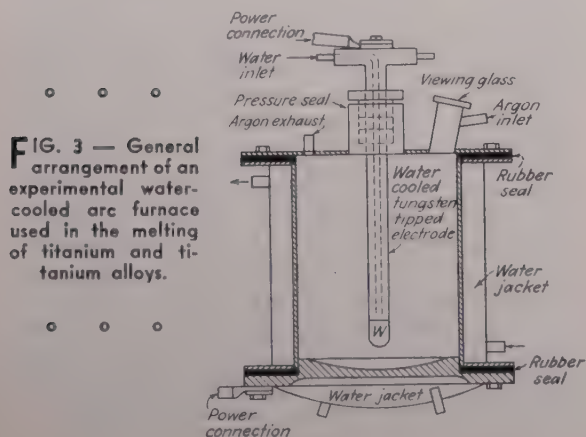


FIG. 3 — General arrangement of an experimental water-cooled arc furnace used in the melting of titanium and titanium alloys.

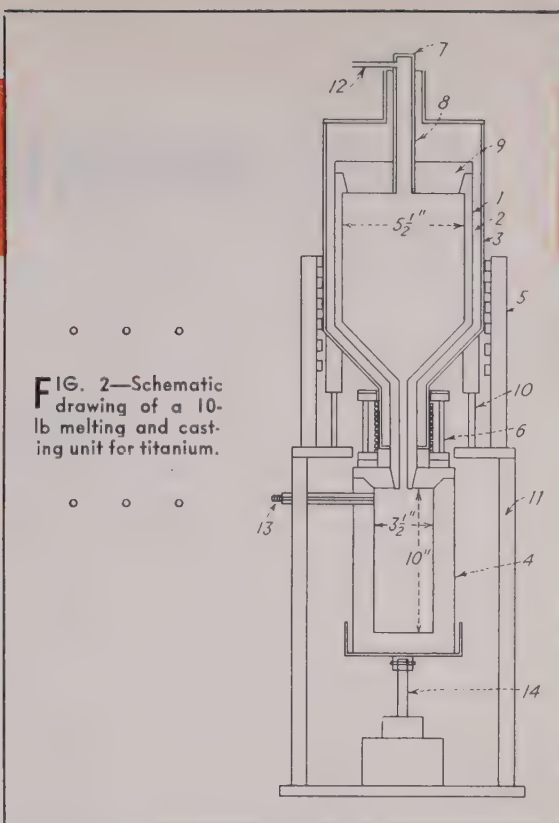


FIG. 2—Schematic drawing of a 10-lb melting and casting unit for titanium.

melt, the opening at the bottom of the crucible is closed with a piece of sponge and the 10-lb sponge charge, consisting of crushed sponge particles, is added. The charge is heated from room temperature to 1110°F in 1 hr with about 6 kw input, and the power is then stepped up to 18 to 20 kw input and the charge is molten in about 30 min. The small coil around the pipe, between the melting crucible and the ingot mold, is turned on at this point and 1 to 3 min later the molten metal flows into the ingot mold.

The ingots obtained by this melting procedure contain from 0.4 to 0.7 pct C and 99.0 pct Ti, with the remainder minor impurities present in the 99.5 pct Ti sponge used in the melt. Facilities have been installed recently for melting and casting 100-lb ingots by direct scale-up of the 10-lb operation.

A formal presentation by O. W. Simmons, et al,³ contained descriptions of two melting units, one of 1/2 to 1-lb capacity and the other of 3 to 5-lb capacity, to be used in an alloy development program.

The smaller unit, illustrated in fig. 3, contains an easily replaceable crucible, the bottom of which is a slightly modified hemisphere. This shape reduces the area of the ingot in contact with the crucible by 28 pct and eliminates the poor melting previously encountered in the lower corners of the ingot. The electrode tube is straight, but the tungsten tip may be moved to describe a circle 1 in. smaller in diameter than that of the ingot. This circular movement during operation insures that the entire charge will be brought into close proximity with the arc.

The melting technique employed not only out-

(CONCLUDED ON PAGE 107)

Metallurgy and Heat

By P. LECKIE-EWING

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A FACTOR which can be shown by every test to affect tool performance is the grain size of the hardened steel. To the extent described previously, grain size may be influenced by melting practice and the size and type of carbide segregate present in the annealed steel. However, the most common and preventable cause for variation in grain size is variation in the temperature of heating for hardening.

The effect of quenching temperature on the grain size and toughness of carbon steel has been so thoroughly investigated and publicized that little mention need be made of it here except to note that plain carbon tool steels have their optimum quenching temperature ranging from 1450° to 1500°F. Underheating results in low hardness while overheating results in low toughness, caused by coarse grain, a factor not improved by tempering to lower hardnesses.

In hardening high-speed steel, the tendency toward grain growth is much greater and the required control of hardening temperature more sensitive than in hardening other tool steels. This follows from the fact that to secure good hardness and wear resistance, hardening temperatures must effect solution of sufficient carbon to develop a Rockwell C of 64 to 65 on subsequent tempering.

The fine carbides dissolve first, and since the fine carbides are most important in inhibiting grain growth, temperatures must not be so high that all fine carbides are dissolved. In particular, temperature must not be so high that partial fusion of the carbide segregate occurs. This

form microstructure, and secondly, close control of hardening temperature. Experiments have shown that temperature is much more important than time. Raising the temperature 10°F will dissolve more carbides and increase the grain size to a greater degree than holding for a longer time at the lower temperature.

Unfortunately, only in the salt bath furnace is it possible to control temperatures with such uniform accuracy that the longer time becomes metallurgically unimportant. Fig. 10 is taken from a study of salt bath hardening recently completed. Note the increase in grain size with increasing temperature is relatively much greater than the increase caused by prolonged soaking at any one temperature. It is true that under very careful hardening conditions such as have been reported by Schlegel¹, muffle furnace hardening allows soaking at the hardening heat with-

¹ W. A. Schlegel, "Surface Carbon Chemistry of High-Speed Steel," *Trans. ASM*, vol. 29, 1941, p. 541.

out harmful effects. However, under production conditions in these types of furnaces, a prolonged soak is not advisable owing to the temperature rise in the work. In this case, also, it is the temperature that is important.

An important property which can be influenced by heat treatment is wearability. Although wear tests, like toughness tests, are subject to numerous variables, it is generally recognized that for cutting tools wear is primarily a function of operating hardness and amount of excess carbide. The influence of hardness is readily apparent; but with respect to the amount of excess carbide, it is of interest to note that if two plain carbon tool steels of 1.00 and 1.20 pct C are tested in use at the same Rockwell C, the

In the first part of this article, *THE IRON AGE*, Dec. 30, 1948, the author explored problems encountered in the selection of steel for cutting tools and discussed metallurgical factors, including hardenability, hardness, toughness and grain size.—Ed.

implies first of all a balanced analysis and uni-

Treatment of Cutting Tools

Rigid control must be exercised over metallurgical details if optimum results in cutting tool quality are to be realized. Since the metallurgical factors involved are dependent largely on heat treatment, this phase receives considerable attention in this concluding part of a two-part article. Means of temperature control and atmosphere control are described, and special treatments such as refrigeration, nitriding and chromium plating are also considered.

higher carbon steel will outwear the other to a considerable degree. Raising the carbon will slightly decrease toughness but with the proper annealed structures and heat treatment, the loss in toughness is negligible.

It is important to note in this regard that the alloy content of the steel has a profound influence on the relative amount of excess carbide. For instance, high-speed steel contains but 0.70 pct C, yet its high alloy content makes this equivalent to about 1.60 pct plain carbon steel with respect to the amount of excess carbide. This fact accounts in part for the high wear resistance of high-speed steels.

The tungsten finishing steels are another example of high carbon (1.30 pct) combined with high alloy content (3.5 pct W) to make a very wear-resistant tool steel. Unfortunately, these steels are less tough than carbon steels and do not possess red hardness. However, under certain conditions, they will outwear carbon steel 4 to 10 times.

The reason for the influence of excess carbides on wear-resistance of tool steels is well illustrated in fig. 11. This photomicrograph shows microhardness impressions in a section of hardened high speed steel. The impression in the carbide may be seen to be smaller than that in the surrounding steel, indicating a considerable difference in hardness. Actually, the hardness of the carbide is approximately 77-Rc while that of the steel is 64.5.

Surface Changes Induced by Heat Treatment

Perhaps the most important factor in the heat treatment of cutting tools is the change induced by the heat treatment on the surface of the tool, particularly when the tool is not ground after hardening. In many cases the surface

changes caused by heat treatment are not fully under control, a fact which has encouraged the production of "ground all over" tools.

Heat treatment of the carbon and low alloy tool steels can have no desirable effects on the surface zones and in fact will have a tendency to decarburize and produce a soft skin on all these steels. On the other hand, the tungsten high-speed steels tend to carburize at the surface on short heating times when hardened from muffle furnaces with common atmospheres. The amount of carburization will depend primarily on the atmosphere, but the first surface reaction in any atmosphere is one of carburization. With long soaking times at the high heat, the steels will decarburize in any of the atmospheres (Schlegel¹).

The molybdenum types of high-speed do not follow this pattern and will decarburize severely even with an 11 pct CO atmosphere. A very high CO atmosphere (smoky flame) will tend to carburize these grades. It follows that the high-speed steels, when correctly hardened in muffle furnaces, may possess a thin carburized skin. This carburization, although it may be detrimental to fine edged tools, may be of advantage to certain types of single-point cutting tools. The "ground all over" technique may not therefore be good practice under certain conditions.

With regard to hardening high-speed tools in a salt bath, this method is the only one known to the author which will allow hardening without either carburization or decarburization of even the points of fine edged tools. Properly rectified, a salt bath for the high-speed steels performs truly neutral hardening. Microhardness readings on salt hardened tools will show no change even at 0.0004 in. below the surface. It is only under these conditions that one may feel sure

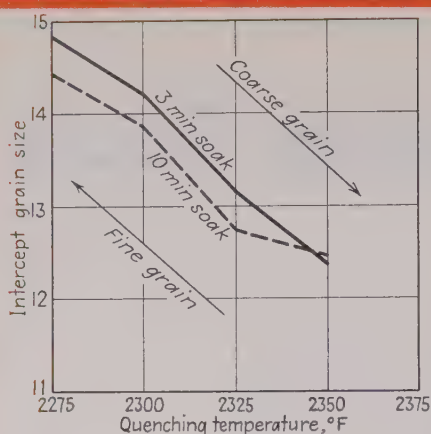


FIG. 10—Effect of temperature and time at temperature on intercept grain size of an 18-4-1 steel. All samples taken from same bar. Salt bath hardened.

the various hardness-toughness and impact tests truly represent the metal which is actually doing the cutting.

The essentials of a hardening method for cutting tools are accurate control of temperature, and accurate control of hardening atmosphere. Of the two essential conditions, the more important is temperature control. This is accomplished by a multiplicity of instruments, nearly all of which rely on the thermocouple—potentiometer system. For low temperatures, metal wire thermocouples in protection tubes are inserted into the furnace work chamber and coupled to an electrical-mechanical control instrument. For high temperatures (over 1800°F) an indirect method which does not subject the couple to the corrosive action of the heat treating gases or salts is used. In certain cases an optical pyrometer has a satisfactory application if care is taken to avoid smoke and fume. Actually, the optical pyrometer is perhaps best suited for rapid checking of work temperatures in clear atmospheres and for checking the temperature control of salt baths.

It should be pointed out that accuracy of the order of $\pm 5^\circ\text{F}$ at 2300°F is desirable for the best salt bath hardening of high-speed steel. Such accuracy demands the best control instruments and a rapid system for checking the control instruments. The optical pyrometer is ideally suited to such an application. When used for this work, the instrument is sighted on the bottom of a tube closed at one end, the tube being partially immersed, closed-end down, in the bath. In this way the effects of fume and scum are eliminated, and accurate checks can be obtained.

It should not be concluded from the above comments that the old time hardener who judged temperature by eye and who controlled his furnace by hand has vanished from the heat treat department. It is true that instrumentation of the hardening room has made tremendous growth in the last 20 years, but instruments still have their limitations, one of which is the inability to think. There is a trend toward com-

plete instrumentation of the hardening shop and the replacing of hardeners with operators. This policy undoubtedly has its merits when the machinery steels are used, and where mass production is essential, but for cutting tools, many of which may require different properties, and almost all of which vary in size and design, too much instrumentation is not possible nor desirable. With the proper application of instrumentation it is quite possible that a man with no experience could turn out fair quality hardened tools; however, using the same instruments, an experienced hardener could turn out first-rate work in a fraction of the time.

Perhaps the salt bath is the least subject to hand operation of all modern furnaces, but conversely, this furnace requires the maximum checking routine. Since the work cannot be observed during salt bath hardening, such factors as temperature and decarburization control require other instruments or laboratory techniques for their adjustment.

All modern furnaces for hardening both carbon and high-speed steels have some provision for controlling the composition of the gases surrounding the work. Control of this furnace atmosphere is generally obtained by burning carbonaceous material, solid or gas, in a separate chamber which may or may not be attached to the furnace proper. By varying the relative amounts of air and/or gas, the composition of the combusted gas can be made to vary over a wide range to produce a carburizing, neutral or decarburizing effect on the work. Atmospheres produced by the more expensive and efficient type of generator are often passed through quite complicated chemical processes to remove all traces of water vapor which, if present, would tend to cause decarburization. The simpler types of atmosphere do not have this provision, and while they do not enable the production of scale free work such as may be obtained under ideal atmosphere conditions, they do produce work which is not decarburized.

Analysis of the atmosphere may be carried out with reasonable precision by means of a gas analyzer, but the simple wood block test also gives satisfactory results. For this test, a small wood block is placed on the furnace hearth and observed during and after combustion. The color and type of flame produced and the appearance of the charcoal after combustion give quite accurate indications of the degree of oxidation of the atmosphere. For uniform hardening, good circulation of any atmosphere is essential since any stagnant pockets will eventually produce severe decarburization.

Furnaces which have no provision for separate atmosphere control, such as the semi-muffle oil or gas type furnaces, can be regulated to a certain degree by varying the air:oil or air:gas ratio. Such methods are limited to the temperature the burning fuel must produce.

Both the alloy and plain carbon grades of carbon tool steel are most successfully hardened in an oxidizing atmosphere. Manufacturers' catalogs contain specific recommendations for

each grade and should be followed for best results.

As has been mentioned, hardening high-speed steel in atmosphere controlled furnaces presents a somewhat different problem. Large heavy work with flat cutting edges may be hardened satisfactorily, but fine work will tend to burn at the sharp edges. This burning or melting effect results from the fact that all atmospheres are carburizing to 18-4-1 type high-speed steel at the hardening temperature.

The molybdenum types of high-speed steel will also carburize when the atmosphere is adjusted to prevent decarburization. Warning should be given against the very "dry" fire; i.e. a highly oxidizing atmosphere. Such an atmosphere at this high temperature will blister the work. It is advisable to keep the furnace atmosphere strongly reducing for these grades. An experienced hardener can tell with considerable accuracy the condition of the atmosphere by a glance at the flame emerging from the peep-hole in the furnace door, or by examination of the degree of smokiness of the furnace interior.

The question of atmosphere does not apply in the case of salt and lead baths since these furnaces operate under different principles. However, proper care should be taken with both these types of furnace to prevent oxidation of the bath which would cause decarburization of the work.

Hardening Practice

In view of the innumerable types and specifications, only a few general notes on the actual hardening methods for cutting tools will be discussed.

Carbon steels may be hardened in controlled atmosphere muffle-type furnaces or in lead or salt baths. Lead baths have many attractive features such as ease and rapidity of handling and hardening, cleanliness of finished work, and low dragout loss. In comparison with salt baths, lead baths heat faster and the work has less tendency to spatter on water quenching. Lead baths, owing to the relative densities of the lead and steel, will float any dropped tool, thereby decreasing loss but raising the difficulty that all work must be forced into the bath. Both lead and salt baths tend to decarburize if not kept in good condition. Lead baths are limited in temperature range, but within that range, are well suited for hardening the carbon and low alloy steels. For general purpose work where very rapid production is not required, a salt bath with a range from 1200° to 1800°F is perhaps more versatile.

Owing to the tendency for decarburization in the lead and salt baths, work of easily decarburized steel such as the high silicon shock resisting steels is perhaps hardened better in a controlled atmosphere furnace. This furnace heats very much slower than a lead or salt bath, but does not require so much jiggling of the work, nor is it limited to as narrow a temperature range. It should be emphasized that a controlled atmosphere furnace has a very desirable feature in that its atmosphere can be ad-

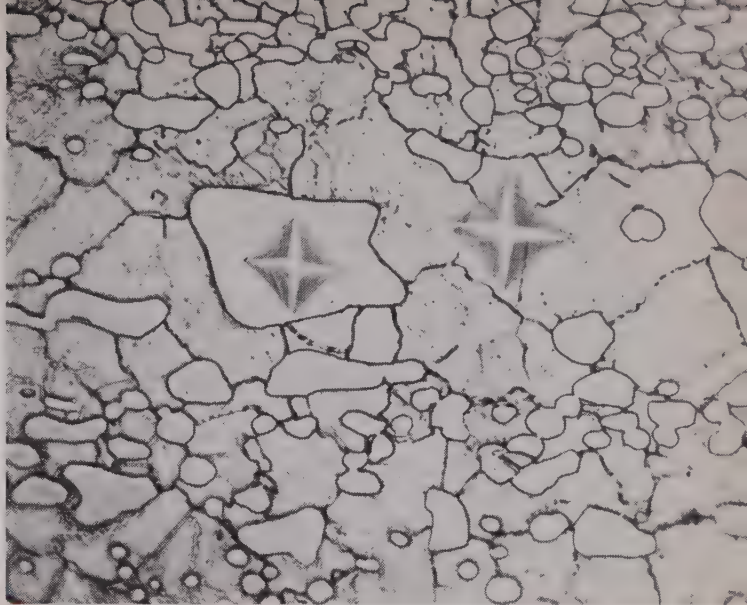


FIG. 11—Structure of an 18-4-1 high-speed steel. Heat treatment—2350°F hardening temperature, not tempered. Micro shows heavy carbides within carbide streak; note microhardness impressions in carbide and matrix. Hardness approximately 77 Rc in carbide and 64.5 Rc in matrix. Etched in 5 pct Nital for 4 min. 1500X.

justed to carburize or be neutral to any steel. The lead bath does not possess this feature, while in salt baths it is more difficult to control.

Modern hardening of high-speed tools is performed in either a controlled atmosphere furnace (the electrically-heated type being most popular) or a salt bath. There are a few installations where the older type semi-muffle furnace without complete atmosphere control is used, but owing to the nonuniformity of work produced, this type of furnace is gradually being discarded.

Some of the advantages and limitations of the salt bath v. muffle furnace hardening have been discussed in preceding paragraphs. Muffle furnaces in addition, are generally operated under slightly different temperature conditions than salt baths, it having been found that salt bath temperatures should be about 50°F lower to achieve optimum results. This follows from the nature of heating in the two mediums. The muffle furnace depends on radiant heat to heat the work while the salt bath depends chiefly on conduction. Therefore, as the work temperature approaches the muffle-furnace temperature, the rate of heating will fall off markedly. For this reason chiefly, muffle furnaces in production are run at a higher temperature than actually required for hardening, and the work is removed before the furnace temperature is reached, i.e., on a rising heat.

Salt baths on the other hand transmit heat more rapidly and more nearly on a linear basis so that it is possible to run the furnace at a lower temperature and actually bring the work up to furnace temperature. From the nature of salt bath heating, work should be thoroughly preheated before immersion in the high heat to

eliminate, as far as possible, cracking from heating strains. It is often advisable with complicated or large tools, to use a double preheat, one at 1100°F and one at 1500°F to 1600°F before transferring to the high heat.

When properly rectified, salt baths neither decarburize nor attack the finest points of fine edged tools. Muffle furnaces will tend to carburize under nearly all conditions. This would not necessarily be an undesirable condition were it not that carburization on the fine points causes melting and loss of size on these types of tools. In general, muffle furnace hardening tends to cause loss of size by burning action, while salt baths preserve the work very well in this respect.

Size change by transformation will vary with the work and hardening temperature; however, it may be noted that salt baths tend to produce more overall size change because the heating is more thorough than in muffle furnaces. This effect could be masked by the quenching method employed, but if, for example, a tool, muffle furnace hardened and air cooled, is compared with a similar tool, salt hardened, salt quenched at 1100°F, and air cooled, the salt hardened tool will show more overall size change. This change will be more reproducible than that of the muffle hardened tool because of the more uniform heating control in the salt bath.

Jigging the work may be more easily performed for certain tools in the muffle furnace, although there is probably little difference overall.

The chief advantage of salt baths, when rectified, lies in their freedom from decarburizing action on any type of high-speed steel. As has been noted however maintaining the bath properly rectified is sometimes difficult and requires special facilities. If the bath does become oxidized, decarburization will rapidly become very severe and may not be discovered until the tool is put into use. The muffle furnace, while by no means affording such precise control of surface conditions, nevertheless allows convenient checking of the hardening conditions, since all that is required is a glance at the flame of the burning gas atmosphere. This check can be performed at the instant of hardening.

Although the tempering reaction for high-speed steel is much more complicated, metallurgically, than is hardening, the tempering operation is much simpler and subject to less operational error. Most tools are tempered 1 to 2 hr at 1050° to 1100°F. A thorough temper which eliminates residual austenite will, for equal hardness, produce a tool more resistant to strain cracking in use. This is particularly important for the larger tools.

For best results the temper is repeated after allowing the work to cool to room temperature. The most important factors here are (1) accurate temperature control for reproducible results, (2) a cycle that effectively heats the work throughout, and (3) a furnace that has a uniform temperature distribution throughout the heating zone. The most popular furnace for tempering is the air-circulating type wherein

the work is heated chiefly by conduction from heated air blown through the chamber. This type of furnace has the most uniform and rapid heating action for tempering.

Special Treatments

During the war years, much attention was given to the subzero hardening of high-speed tool steels. The method was over-publicized, and some of the phenomenal results at first obtained were later found to be nonreproducible. It is known, however, that the subzero treatment will increase the hardness of over-hardened, carburized, or under-tempered steels. In other words, it is somewhat of a corrective for low hardness resulting from incorrect hardening techniques. On properly hardened and thoroughly tempered steels it has been proved that the subzero method does not increase or improve the hardness or cutting ability.

Various surface treatments are sometimes employed to increase the surface hardness or wearability of high-speed tools. The most important are nitriding and chrome plating.

Nitriding is performed on the finished tool and involves heating the tool at about 1000° to 1050°F in a salt bath containing a high percentage of molten cyanides. The time cycle varies from 10 to 30 min, and will produce a case depth of from 0.0005 to 0.001 in. The case so formed consists chiefly of iron and chromium nitrides and becomes very hard at about 70 Rc.

As well as being hard, the case is partly non-metallic and has a low coefficient of friction, a factor further increasing the usefulness of the case for increasing tool life. The treatment is not advisable where cuts are heavy, since there is a tendency for brittleness of fine points. The case may chip under these conditions.

Chrome plating is sometimes resorted to in order to improve the life of small taps and gages, etc., where the very low coefficient of friction is advantageous in lowering tool wear. The plate is applied under controlled conditions and a very thin deposit, not over about 0.0002 in., is made. Under such conditions, the plate is extremely hard, micro hardness values of 68 to 70 Rc being secured. It is necessary to temper the deposit at 300° to 400°F to avoid brittleness and spalling of the plate.

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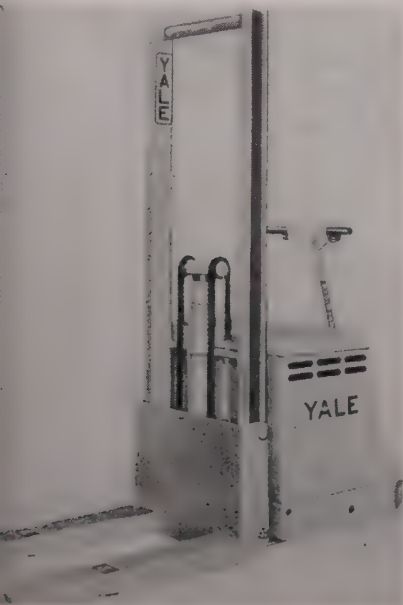
New Material Handling Ideas

Intra-plant conveyance of materials is costly. At the Materials Handling Show in Philadelphia this week some of the most modern techniques in materials handling are being demonstrated. The following items, including pallet, fork, scoop and stacking trucks; continuous, belt, and vibratory conveyers; skid boxes, etc., are representative of such new developments.

A NEW line of completely modern Speedway electric hoists is made in capacities from 1000 to 20,000 lb. The design incorporates all-steel construction and gear train, preformed cable and swaged-on cable fittings. Other features include ball bearing, fully enclosed motors, splined connections, grooved steel cable drum, jaw type brake, push button controls, and a safety limit stop. Hoists are furnished in lug, hook, plain, or geared Timken trolley, mounted crosswise or parallel to runway beam, four-part single reeve, close headroom, base mounted, and with motor driven Timken trolley. Built for 220 v, three phase ac current. *American Chain & Cable Co., Inc.* For more information, check No. 1 on the attached postcard.

Pallet Truck

HAVING 2500-lb capacity, a new low-cost, high-lift *Work-saver* electric pallet truck is battery



operated both for travel and lifting loads. Overall dimensions, excluding the forks, are 39x31 in., and the truck lifts 66-in. pallets for overhead tiering. The mast is 83 in. high permitting the truck to enter low head room spaces. Including the battery the truck weighs 1965 lb. *Yale & Towne Mfg. Co.* For more information, check No. 2 on the attached postcard.

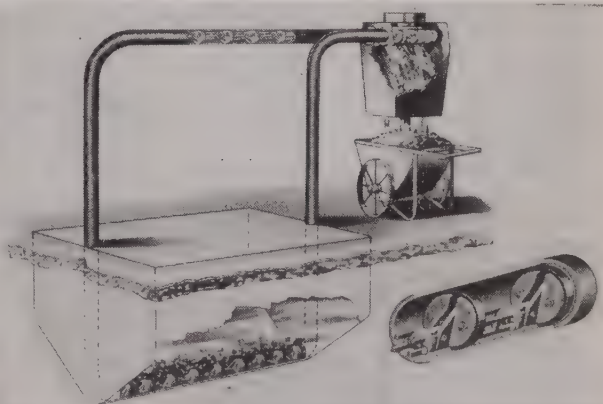
Package Conveyor

HANDLING cases, boxes, bundles, cartons and crates, at the rate of 30 per min is said to be possible with a new conveyor that weighs 500 lb. It is available in standard lengths of 15 to 50 ft and widths of 14, 18, 24 and 30 in. Various types produced include the portable elevating type with pneumatic wheels; the elevating type with steel wheels or caster mounting, and with feed and discharge sections. This conveyor has rubber pulley lagging of 1/4 in. tire tread rubber, easily replaceable without removing the pulley from the conveyor. *George Haiss Mfg. Co., Inc.* For more information, check No. 3 on the attached postcard.

Continuous Conveyor

ELIMINATION of manual labor in the bulk transporting of solid or fibrous material of a loose nature is one of the principal advantages of a new continuous conveyor, that will move any material

that will settle to the bottom of a tank, hopper, bin or other form of reservoir. The conveyor consists of a series of Neoprene or cast iron flights, assembled on an endless chain. The chain and flights are pulled through a pipe casing by means of a high torque gear transmission. The casing, custom bent to the specifications of the origin and delivery points, is 2, 4, or 6 in. diam depending on the capacity requirements of the particular installation. The casing has open sections at the pickup and release points in the conveyor system, ma-

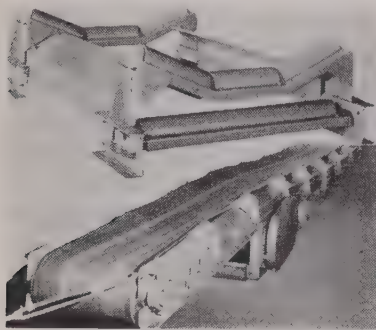


terial to be transported being picked up from the bottom of the reservoir and carried to the delivery point and released. In the metalworking field, the conveyor moves metal chips, cast iron dust, aluminum oxide and abrasive sludge, or all waste products. *Honan-Crane Corp.* For more information, check No. 4 on the attached postcard.

Belt Conveyor

THE efficiency of the idlers, the basic unit in a new unitized conveyor system, is said to be the

result of precision ball bearings in each roller and non-oxidizing, non-emulsifying, sealed - in lubricant that retains its viscosity through a

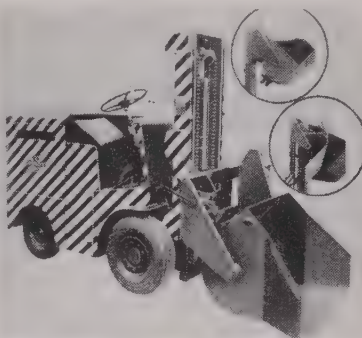


wide range of temperatures. The combination of bearings and lubrication gives the freest turning rolls, less wear, and lower starting movement. The resilient mounting of Neoprene that cushions each roll eliminates shock on the bearings, reduces vibration, and provides automatic alignment. The rolls are self-cleaning. The conveyor itself features minimum heights of head section, main chassis, and tail section; spill shields to protect the belt; compact drive and power unit; short, maneuverable, tail section; and return idlers assembled in a composite unit with the troughing idlers, thus requiring no separate mounting structures for the return idlers. The conveyor, effective on all types of belt conveying, is suited to installations where it has to be moved frequently. It does not rely on permanent support structures. *Transall Inc. For more information, check No. 5 on the attached postcard.*

Self-Loading-Scoop Truck

A SELF-LOADING scoop in capacities up to 15 cu ft and pneumatic tires are new equipment on 3000 and 4000 lb electric industrial fork trucks. The scoop loads itself automatically when driven into a pile of loose material without the use of hydraulic cylinders or other auxiliary power, loading 100 pct of capacity in the loose materials and as much as 60 pct in ceramic clay of high moisture content. When handling abrasive materials, Amsco edging and wear strips are provided on the bottom of the scoop. Loads are released at any predetermined height by a fixed trigger or at any height within the lifting range of the truck by a manually operated lever. Controlled dumping at any desired

speed is by a self-actuating cylinder and metering valve. The scoop is mounted on a standard carriage plate and is interchangeable with



standard forks. *Crescent Truck Co. For more information, check No. 6 on the attached postcard.*

Hoist Limit Stop

A NEW limit stop that makes control of Reading electric hoists more accurate and positive, has been announced. The limit mechanism is entirely enclosed within the hoisting unit, providing a more streamlined appearance. The mechanism also simplifies adjustments and the setting of limit stops. Bulky operation rods are eliminated. *Reading Chain & Block Corp. For more information, check No. 7 on the attached postcard.*

Low-Platform Truck

FOR plants that transport close to floor levels heavy loads of materials or products having large surface areas, placed on skids or supported on frames mounted on skids, a new power industrial truck with a 12 ft x 32 in. platform offers safety and stability. Weight of the truck is 8000 lb; its load-carrying capacity 20,000 lb. Top of platform in lowered position is 11½ in. above floor level; maximum height elevated 17 in. The platform is raised hydraulically. An outstanding fea-

ture is the four sets of wheels under the platform. Hydraulic-power steering mechanism enables the driver to turn the truck in 99½-in. aisle intersections. *Elwell-Parker Electric Co. For more information, check No. 8 on the attached postcard.*

Self-Propelled Crane

THE new wide track TL-20 self-propelled crane has a lifting capacity without outriggers of 18,000 lb at a 10 ft radius when operating on rubber. It is a single-engine, one-man operated unit with four forward and four reverse speeds. It travels up to 7 mph and can be equipped with more than 15 different attachments to meet many material handling needs, including bulk and package materials, castings, scrap and other materials in various sizes and shapes. *Thew Shovel Co. For more information, check No. 9 on the attached postcard.*

Corrugated Steel Box

NEW corrugated steel boxes for use with revolving head fork trucks are designed for handling scrap or forgings. Slots at two sides make convenient handling in dumping operations. Boxes are all-welded steel construction, with square corners that give added interior box space. Design also permits conservation of floor space in stacking. Boxes are manufactured to customer specifications. *Palmer-Shile Co. For more information, check No. 10 on the attached postcard.*

Stacking Truck

LOW initial cost of motorized hand trucks is combined with the advantages of rider-type industrial trucks for short-haul duties, in the battery operated *Transrider*



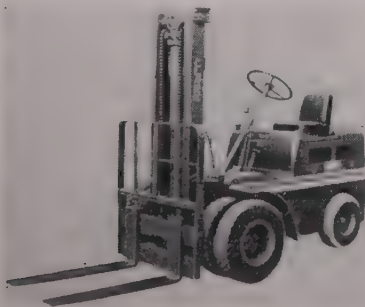
Stacker. Although engineered as a stacker, it is said to be equal in performance to any fork truck of the same capacity. Its dimensions permit operation inside of box cars



and trailers. The truck can lift to 130 in. Single lift before the telescopic uprights are extended is 66 in. Capacity is 2000 lb with a 48-in. load; 2500 lb with a 36-in. load; 2850 lb with a 30-in. load; and 3000 lb with a 28-in. load. The truck needs only 57 in. to turn in intersecting aisles; a right angle turn requires 71½ in. plus the length of the load. The Stacker has three speeds forward and three in reverse, and an automatic tilt of 10° backward and 5° forward. The truck has Skylift features of drive on the load wheels; high pressure hydraulics; automotive type controls; and dead man control. *Automatic Transportation Co. For more information, check No. 11 on the attached postcard.*

Wide Drive Axle

STABILITY and safety in high-lift operation of pneumatic tired fork trucks are claimed for a recently developed, wide drive axle,



mounting dual tires. This wide axle is recommended for all Clark Yardlift 40 models where opera-

tions require lifts above 144 in. The dual tires provide more traction and greater flotation resulting in smoother, safer operation. The new axle is available for either factory or field installation. Special fenders, easily attachable, are included. *Clark Equipment Co. For more information, check No. 12 on the attached postcard.*

Vibratory Conveyor

VIBRATORY conveyers in various lengths and capacities, for suspension or base mounting and powered by one or more vibratory motors mounted above or below the trough, are advantageous in the handling of extremely hot, abrasive materials. Sealed, tubular troughs convey dusty, poisonous materials. The movement of the trough is confined entirely to the spring system



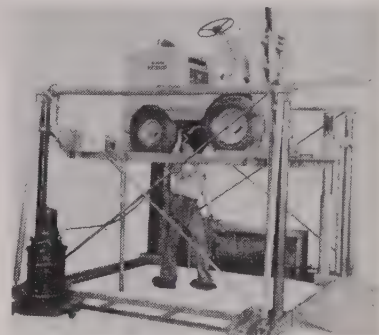
of the vibratory motor; there are no belts, idlers or variable speed motors to maintain. A dial switch provides variable control of the rate of material flow. The conveyer illustrated is a heavy tonnage suspension type with an open flat pan trough, 20 ft long, and used for supplying ore to retorts. *Syntron Co. For more information, check No. 13 on the attached postcard.*

Portable Power Boosters

IT is possible to have portable power in any conveyer system to maintain a continuous flow of material, or for loading and stacking operations, by using a Sage portable power booster. Desired degree of incline is selected by a hand wheel. Belt widths are 8, 10, 12, and 14 in. and the equipment includes 1/3 hp, 110 v, 60 cycle, single-phase motor, floor locks, and four heavy duty free moving casters. The frame is 10 ft long. Special lengths and equipment are also manufactured. *Sage Equipment Co. For more information, check No. 14 on the attached postcard.*

Hydraulic Lifter

AN electric hydraulic lifter for servicing fork lift trucks, industrial trailers and platform trucks is built in 6000 and 12,000-lb capacities. This maintenance lift-



er's open platform elevates trucks to a proper height where lubrication, inspection and servicing may be quick, safe, and thorough. Safety features include hooks which lock into the legs at any point during the platform's rise, and safety-pipes which drop from the platform to the floor once the proper height is attained. Dead-man control is a further precaution. *Service Caster & Truck Corp. For more information, check No. 15 on the attached postcard.*

Die Handling Truck

DESIGNED for handling 3000-lb loads, a hydraulic high lift truck is now furnished with boom and chains for die separating. The boom extends 36 in. and the hooks are fastened to sliding rings so that large or small dies can be handled on the 30x36-in. platform.

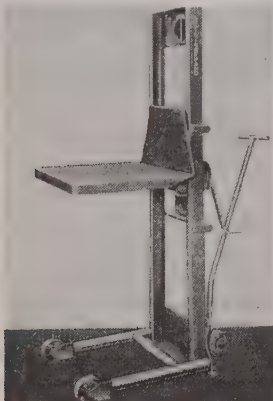


Elevation is by a two speed hydraulic hand pump. A winch with 15 ft of steel cable is provided for drawing the dies from presses to the truck platform. Stability is

provided by the auto steer arrangement on the front wheels, and the truck can be locked in position by a brake that engages the floor. The platform has an elevation range of 6 to 54 in. The equipment is also offered in 1000 and 2000-lb capacities. *Lyon-Raymond Corp.* For more information, check No. 16 on the attached postcard.

Portable Lift Truck

CRANK up-crank down operation through a planetary gear drive winch permits placing and



holding the platform of the new *DH Handy Hoister*, at any level. One revolution of the winch handle gives a 3-in. lift. Capacity is 500-lb loads. Wheels and sheave turn on roller bearings and the 24x24-in. lifting platform of heavy gage reinforced sheet steel rolls on guide wheels equipped with ball bearings and safety guards. The lifting height is 58 in.; lowered height 5½ in. Wheels at front and rear are 5 in. diam, in steel, rubber tired, or molded plastic. *Lewis - Shepard Products, Inc.* For more information, check No. 17 on the attached postcard.

Conductor Cord Trolleys

A DEVICE that is said to make practical the supplying of electric current to electric hoists and other mobile equipment operating on monorail tracks by a flexible conductor cord, is the new *Budgit* conductor cord trolley. The cord is supported by the trolleys on the same track on which the hoist is installed. Trolleys permit the supporting of conductor cords around curves on monorail tracks and the cords will go through the same switches as the hoist trolley. This method can be used for tracks as long as 175 ft in which there are

curves and switches. The conductor cord is kept up out of the way and the drop of the cord when looped



may be kept as little as 2 ft. *Manning, Maxwell & Moore, Inc.* For more information, check No. 18 on the attached postcard.

Pallet Alignment Assembly

STACKING or tiering wood pallets in a quick, simple and positive manner is facilitated by a steel alignment cone assembly that is fastened at the four corners of the pallet by an adjustable lock nut. These cones fit naturally and easily into similar cones, detachable from the vertical supports, to provide a positive, steady nest tight enough to minimize swaying or movement, and yet permit unhampered removal of the upper pallets. Loads



are transferred directly to the floor through the vertical supports and lower pallets do not bear the weight of the upper pallets. Alignment cones are adapted to any size pallet, and the vertical supporting tubes are supplied in three different diameters, in any desired length. *Paltier Corp.* For more information, check No. 19 on the attached postcard.

Mobile Crane

A MOBILE crane has been developed that is capable of loading and unloading box cars, gondola cars and flat cars loaded with 5-ton bundles. The boom has a hydraulic power topping mechanism, permitting the operator to elevate the boom to a sufficient height, project it to pick up the load at the far side of the car, lift, transport and deposit it on a waiting motor truck or in the yard or warehouse. For traveling, four speeds forward and four speeds reverse, up to 10 mph, are provided. The machine is available with either solid cushion tires



or pneumatic rubber and is gasoline or Diesel engine powered. *Silent Hoist & Crane Co., Inc.* For more information, check No. 20 on the attached postcard.

Skid Box

HEAVY loads of scrap, castings, industrial products and materials can be quickly and conveniently transported with the new skid box that is constructed of heavy corrugated steel panels with double reinforced corner angles, rolled edge top, and cast and forged steel latches. The formed channel legs offer floor protection. The skid box can be used with lift trucks or crane and is available with various types of discharge doors. *Phillips Mine & Mill Supply Co.* For more information, check No. 21 on the attached postcard.

Fork Extensions

SLIP-ON fork extensions make it possible to handle loads of different lengths with the same fork truck. When longer loads need to be handled, a pair of these fork extensions can be placed over the forks already mounted on the truck. Extensions are of welded steel and available with tapered ends for handling rolls of paper; standard ends for picking up pallets; and

chisel ends for handling bagged or loose material. They are locked at the heel of the fork by stud and latch, becoming an integral part of the Standrive fork truck. *Lewis-Shepard Products, Inc.* For more information, check No. 22 on the attached postcard.

Industrial Floor Truck

AN industrial floor truck, the *Load Carrier, Jr.*, has loading space 30x60 in. between end racks, and overall length of 63½ in. It has maximum capacity of 2500 lb distributed load and is furnished in tilt, non-tilt, wagon or dolly type. Wheels of semi-steel, aluminum, cushion rubber, hard rubber, and plastic can be furnished in 4, 6, and 8-in. diam. The truck uses standardized accessories used on the larger model. *Market Forge Co.* For more information, check No. 23 on the attached postcard.

Pallet Racks

PORTABLE racks for stacking palletized materials, offered in standard and heavy duty models, are designed to accelerate order picking and case handling by permitting the tiering of pallet loads to ceiling heights without tying up low level goods. Order picking lines are thereby shortened and a greater variety of reserve stocks can be stored in one bay. The racks can quickly be installed by merely spotting them in place with fork trucks. Rack levels can be raised to accommodate high loads by the use of removable extension posts. *Equipment Mfg. Co., Inc.* For more information, check No. 24 on the attached postcard.

Platform Truck

PRODUCTION of a heavy duty platform truck, the *Freighter*, has been announced. The truck is available in seven platform sizes with either rapid-flame hardened micro-steel, molded-on cushion rubber, or Durastan resinoid wheels. Individual weights of the truck vary from 167 to 242 lb. Features of the truck include welded steel axle housing on the running gear, 16-in. diam load wheels with 8 in. faces. Casters on the truck are bolted to a welded steel bolster that is lagged to the side and end rails. The deck is 1-in. hardwood. Capacity with micro-steel wheels is 5000 or 6000 lb depending on the caster model chosen. With molded-

on cushion rubber wheels the capacity is 2960 or 2680 lb. The truck is available in two styles: the level type, with two load wheels on one end and two swivel casters on the other end; and the tilt type, with two load wheels mounted at center of the truck and one swivel caster mounted at the center of each end. *Rapids Standard Co., Inc.* For more information, check No. 25 on the attached postcard.

Platform Utility Truck

A COLLAPSIBLE aluminum platform utility truck weighing only 60 lb has a load rating of 1200 lb. A feature of the *Fold-A-Truc* is the collapsible handle that folds against the platform when the truck is not in use, permitting the truck to be set on end and stored in a space 10 in. deep. *Fold-A-Truc* is riveted throughout and its 24x40 in. heavy aluminum plate platform is reinforced with a heavy

aluminum angle running the length of the platform. Two swivel and two rigid 5-in. double ball bearing casters provide easy maneuverability. *Waprin Corp.* For more information, check No. 26 on the attached postcard.

Drag Clamp

FOR conveying sheets, plates and flat stock around the plant, a drag clamp has been designed that works on the same principle as the Merrill-Volz two principle gripping clamp. The rugged one piece jaw frame is mounted on a heavy shoe or base that acts as a skid for ease of movement. Safety and ease of attaching are major factors. The sheet is slipped between the jaws of the clamp where it is automatically gripped. Any power unit will drag the sheet to any desired location. *Merrill Bros.* For more information, check No. 27 on the attached postcard.

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NAME.....TITLE.....

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Information Free . . .

Foundry Ovens

CORE and mold ovens of a variety of types are described in bulletin 48. Portable, rolling drawer, rack, car type, continuous, tower and other ovens are shown and operations with each type are discussed. *Foundry Equipment Co. For more information, check No. 28 on the postcard.*

Nibbling Machines

TURRET head metal cutter or nibbler for cutting all metals from 30 gage up to 1 in. is described in booklet. Shearing attachment for intricate shapes in light stock is also described and general cutting tool information is included. *Gray Machine Co. For more information, check No. 29 on the postcard.*

Industrial Carburetor

BULLETIN 1C-22 gives information on a series of industrial carburetors with gas mixture discharge capacities from 4500 to 120,000 cu ft per hr. Bulletin B-10 discusses backfire preventers, refractory disk flame arresters and other safety accessories. *C. M. Kemp Mfg. Co. For more information, check No. 30 on the postcard.*

Titanium Metal

TECHNICAL data and properties of 99.5 pct titanium metal, available in sponge and ingot form, are given in booklet. Tensile properties at room and elevated temperatures, compression data and other information is included. *E. I. du Pont de Nemours & Co. For more information, check No. 31 on the postcard.*

Forging

IMPROVEMENT of metal properties on forging and the various types of forgings are described in 44-page booklet. Designing for forging, dies and tools required for forging, grain flow and the basis of flow lines, commercial forging metals and other subjects are discussed. *Steel Improvement & Forge Co. For more information, check No. 32 on the postcard.*

Case and Cabinet Forming

CATALOG C-700 gives information on machinery and dies for the manufacture of metal cabinets, cases, housings, liners, shrouds and similar products. Contour forming machines, multi-benders, tangent benders, press brakes and other units are included. *Cyril Bath Co. For more information, check No. 33 on the postcard.*

Magnet Wire

PRODUCTION of magnet wire and the types of such wire available are described in 88-page catalog. Drawing, enameling, fabric covering and other operations are illustrated. Cotton, silk, paper, glass, and a variety of enamel and synthetic coverings are described. *Electric Auto-Lite Co., Wire & Cable Div. For more information, check No. 34 on the postcard.*

Silicone Fluids

STABLE silicone liquids, for use as damping and hydraulic media, liquid dielectrics, lubricants, mold release agents, water repellant coatings, additives and impregnants, are described in 34-page booklet. Viscosities range from 0.65 to 1 million centistokes at room temperature. *Dow Corning Corp. For more information, check No. 35 on the postcard.*

Universal Tool Post

UNIVERSAL tool post, for holding flat or square tools on front or back cross slide with the spindle running either direction, is described in booklet. Tap and die holder in which the design eliminates spring plungers and small screws is also discussed. *R & L Tools. For more information, check No. 36 on the postcard.*

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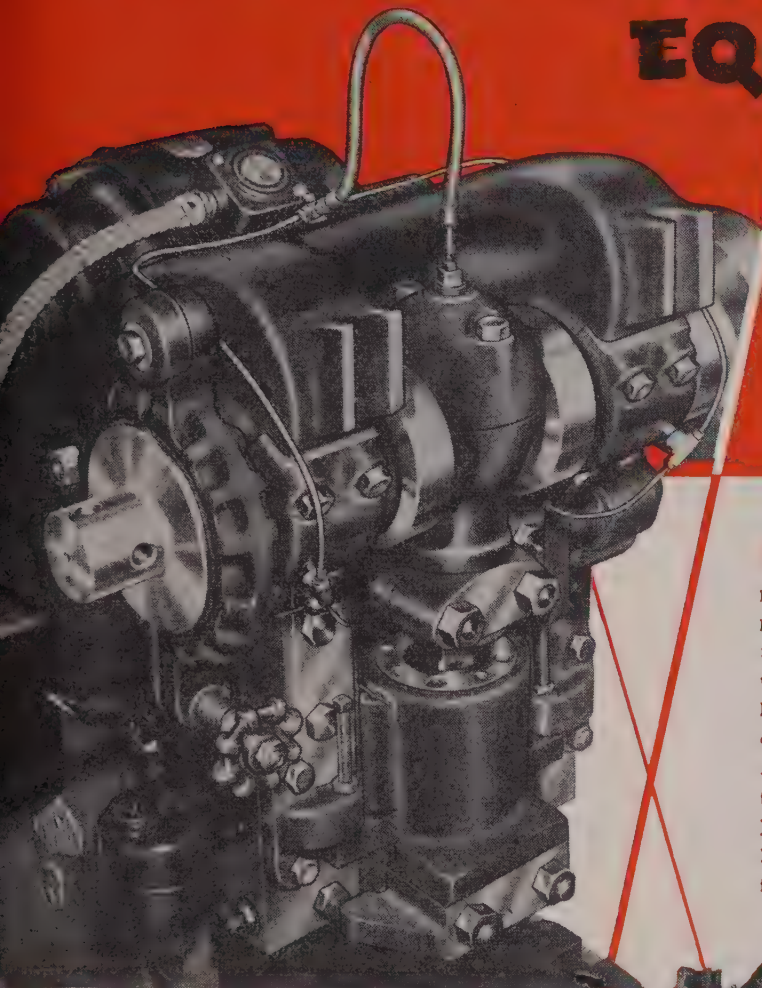
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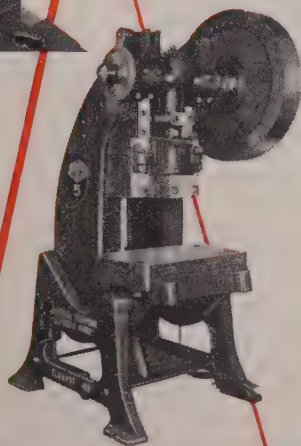
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is a feature of every press we build. The exclusive patented Non-Repeating Safety Clutch protects workers and equipment, yet it is simple in its operation. Two activating springs work to hold trip lever in disengaged position. If one of two springs breaks, the other takes over. Should both fail, the clutch automatically disengages. Springs are easily replaced in 30 seconds without stopping machine.

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on all models from 16 to 90 ton capacity gives you a **PRODUCTION BONUS**. Johnson presses do more die work per dollar, make it possible to contract for a wider range of jobs without increased investment. For special heavy duty, Johnson builds an extra-thick bolster plate to stand the gaff . . . interchangeable with the standard bolster for ordinary production requirements.

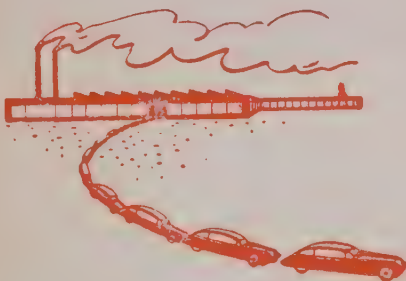
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• Light cars can be strongly advocated on a basis of materials conservation . . . K-F inaugurates its sales program . . . Ford tractor output set at 20 pct of the industry.



DETROIT—It can be depended on that automobile stylists, engineers and sales executives will give you a strong and plausible argument against the light car. Their arguments are based on public acceptance, cost of manufacture and roadability. However, from a standpoint of materials conservation, a strong case can also be made in favor of a light, utility vehicle, stripped of all unessentials and with weight reduced to a minimum that is compatible with adequate strength, power and good riding qualities.

At the moment, the Willys-Overland line alone has been styled along the lines of optimum simplicity. The rumor factory has it that Henry Kaiser has a low-priced car ready to spring at the precise moment when steel becomes available and the market is promising. Some sources continue to insist that Kaiser's first move in this direction will be to introduce a low-priced car through the chain stores like Sears or Montgomery Ward. However, such reports have been consistently denied by K-F officials.

Assuming, however, that a light

car could have been built and sold at an attractive price, it is interesting to examine what might have happened to our dwindling national resources during the postwar period.

Since automobile production was resumed following the war, slightly less than 14 million passenger cars and trucks have been built. Had the entire industry been able to conserve steel to the same extent as Willys's, it is estimated that total passenger car output would have reached 19 million units. Thus, the motoring public would have had 5 million additional new cars. These cars would have been smaller, less flashy and, frankly, less attractive to the buyers who can still afford to purchase a larger and more powerful car.

If this reasoning is carried still further and set against an estimated backlog of 6 million unfilled orders, it could have been that the auto shortage — and perhaps the steel shortage — would be almost over now. (Some sources place the backlog of car orders at 11 million vehicles.)

In designing its postwar cars, Willys engineers adopted the policy of eliminating all unnecessary steel. Pursuit of this policy permitted Willys to build 2.4 pct of the cars produced despite the fact that the company is reported to have received only .67 pct of all the steel sold to the automotive industry.

Again, comparing the Willys-Overland line of cars with other makes, the Jeep Station Wagon has a curb weight of 2950 lb. The smallest standard-size passenger cars range from 3150 to 3300 lb. (It may also be pointed out that the Willys station wagon carries 7 passengers and has a maximum of 98 cu ft of useful cargo space.)

Willys-Overland has been able to stretch its production because it has used steel with originality and economy. Sheet steel requirements for the Universal Jeep are only .291 tons and for the station wagon, .686 tons. Most car builders figure, roughly, that 1 ton minimum of sheet steel is required per body.

A fact seldom discussed by the car makers is that passenger cars are really not designed for the

mass purchasers as is commonly supposed. Rather, new cars are actually designed for the families in the higher income brackets, professional men, salesmen operating on expense accounts, well-to-do farmers and a few hourly-paid employees. Union sources in Detroit have claimed that, even before the war, less than one fifth of the auto workers actually bought the cars they helped to build.

Under existing conditions, the percentage is probably lower than this. Some car producers who have offered a fixed part of the plant output to their employees find the quotas are not being filled.

It has always been true that the majority of auto workers buy used cars at a much lower price than they would have to pay for a new car. The orderly movement of new cars, many of which are normally kept less than 2 years by the original owners, into the low price range is what actually keeps the new car market in a healthy condition.

Under these conditions, it is not to be wondered at that established car producers have hesitated to bring out a light car. When and if a light car is made available in large volume, it will no doubt be offered first by producers relatively new in the field. Right now, Kaiser-Frazer appears to be the best bet.

WILLOW RUN — The months of January and February will be months of decision for the automobile industry.

The production cut announced by Kaiser-Frazer this past week may be the only important curtailment or it may be the first of a series of several retrenchment moves by producers of cars in the medium and higher priced brackets. Rumors have been afloat here for more than a month indicating that certain producers may have to slash their production schedules. However, except for K-F, the industry is discreetly silent about any contemplated reductions in their schedules.

Production at Willow Run last week was at a rate of 600 cars per day. It is now indicated that schedules will be reduced to a minimum of 400 per day, necessitating a pos-

Do it QUICK:

14 machining operations* in 1.49 minutes on this aluminum bronze cam block blank.



Do it ACCURATELY:

On this job, boring, facing, drilling and reaming are accomplished not only at maximum speed but with the exactness specified on the blue print.

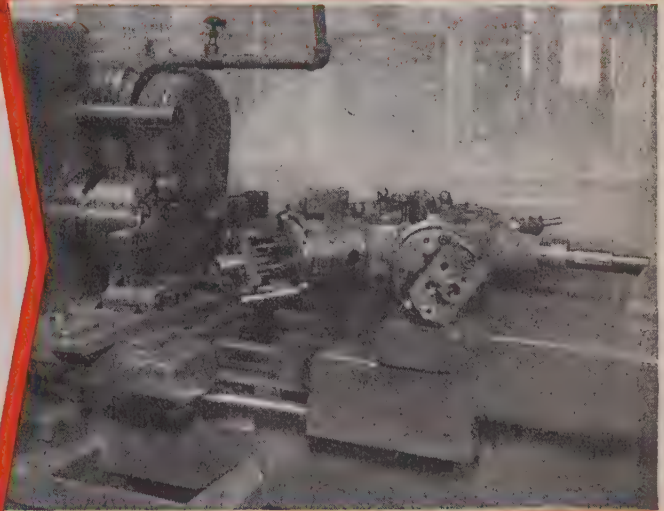
Do it ALL:

Here's the tooling. *One* setting does the trick. The recessed side of the blank is presented to the spindle and gripped on O. D. with 3 chuck jaws. Then:

- 1st T. F. — Rough bore hole
Rough face, one side
- 2nd T. F. — Finish bore hole
Chamfer hole
Finish face, one side
- 3rd T. F. — Ream hole, $1\frac{1}{8}$ " dia.
- 4th T. F. — Drill four $19/64$ " dia. holes on 2" B.C.
- 5th T. F. — Ream four $5/16$ " dia. holes on 2" B.C.

*Adds up to 14 operations

Note that even the *drilling* is done on the P&J Turret Lathe — a tremendous time and trouble saver.



Do it on the P&J 3U SPEED-FLEX

— the last word in Automatic Turret Lathes for low cost, quantity production of parts up to 6" dia; equipped with four automatic changes of speed and three automatic feed changes, electro-pneumatically controlled; split second shift from rapid traverse to reverse feed; independent or simultaneous cross-slide operation with selected turret faces or with all six.

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—Potter & Johnston tooling experts will gladly work out tooling and time estimates for *your* small parts production problems. Simply send us parts or prints.

sible reduction up to 4000 in the working force. The present number of workers is 15,000.

Layoff plans have not been completed as this goes to press. The company has two alternatives, reduce the total number of workers or reduce the number of hours for the entire working force. Details of the layoff are being worked out with the union this week.

K-F officials report the company is sound. Working capital is said to be at an all-time record and total assets are valued at \$118 million. According to Edgar Kaiser, the K-F breakeven point is as low as 250 to 300 cars per day.

Estimated number of cars in dealers hands today is 4 per dealer, bringing the total number of cars in the field to an estimated 18,500. This is less than the number of cars in dealers hands last February. However, January and February are admittedly slow sales months for the company and continuation of the present production schedules might easily work a hardship on the dealers the company is admittedly anxious to encourage.

Both Henry J. Kaiser, chairman of the board, and Joseph W. Fraser, president of the company, demanded immediate modification of the Federal Reserve Boards regulation as a means of promoting sales of cars in the medium price class. Unless a change is made quickly, Mr. Kaiser charged, a "spiral of unemployment" may be started in the automobile industry.

MR. KAISER explained that the company had no strong objection to the requirement which calls for a payment of one third down. Their chief objection to the ruling is the 18 months requirement under which the buyer of a medium priced car is required to pay more than \$100 per month. Mr. Kaiser quoted income statistics to show that an income of \$5,000 per year would be required to make \$100 monthly payments. "Less than 14 pct of the buyers of this country have incomes in this range," he argued.

Prior to the adoption of regulation the usual practice was to permit 24 monthly payments and occasionally 30 months, Edgar Kaiser explained. Mr. Kaiser said that in the first month of operation, the volume of new and used car retail financing for all companies had fallen off 21 pct under regulation.

At a meeting held at Willow Run this week, the dealers were shown four new models which K-F plans to introduce, including a taxicab, a "Vagabond" utility car, a convertible and a new "Hardtop" sport sedan. Only the taxicab is currently in production.

Each of the new cars will be in the upper medium price brackets, it is believed. The Vagabond, which stresses cargo-carrying capacity, can also be converted into a sedan by unfolding the rear seat which is tucked out of the way when the large amount of cargo space is being used. Thus, while offering many of the advantages of a sta-

tion wagon, the new model has the outward appearance of a sports sedan with an entire steel body.

Mr. Kaiser indicated the company was not yet ready to produce a light car.

THE Ford tractor population in this country grew 10 pct during 1948 according to a report issued recently by Dearborn Motors Corp., national marketing organization for the Ford tractor and Dearborn farm equipment. Ford's share of the total 1948 tractor output was 20 pct of the industry volume, bringing the number of Ford tractors currently in operation in United States to 1,100,000. Dearborn marketing experts estimate the number of tractors at work on American farms today is 3½ million compared with 1½ million in 1940.

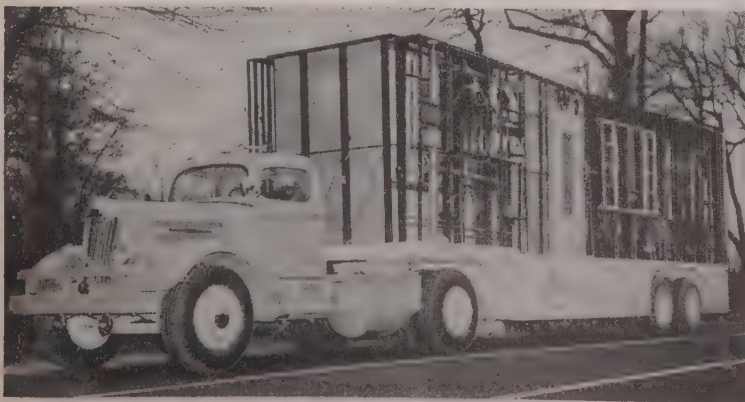
Dearborn Motors sales executives indicate that most farm implements are in good supply today. There has been a return to seasonal buying of many implements. Instalment buying is on the increase.

Tractors, harvesters, corn pickers and combines continue in short supply although this is not true of all geographical areas in the country. Because of low water supply, tractor sales are said to be off somewhat on the Pacific Coast. Similarly, farm implement selling is necessary in many parts of the South. Curiously enough, the return to selling tractors has sometimes occurred in the mostly highly mechanized farm sections of the country. This is a development that few had anticipated.

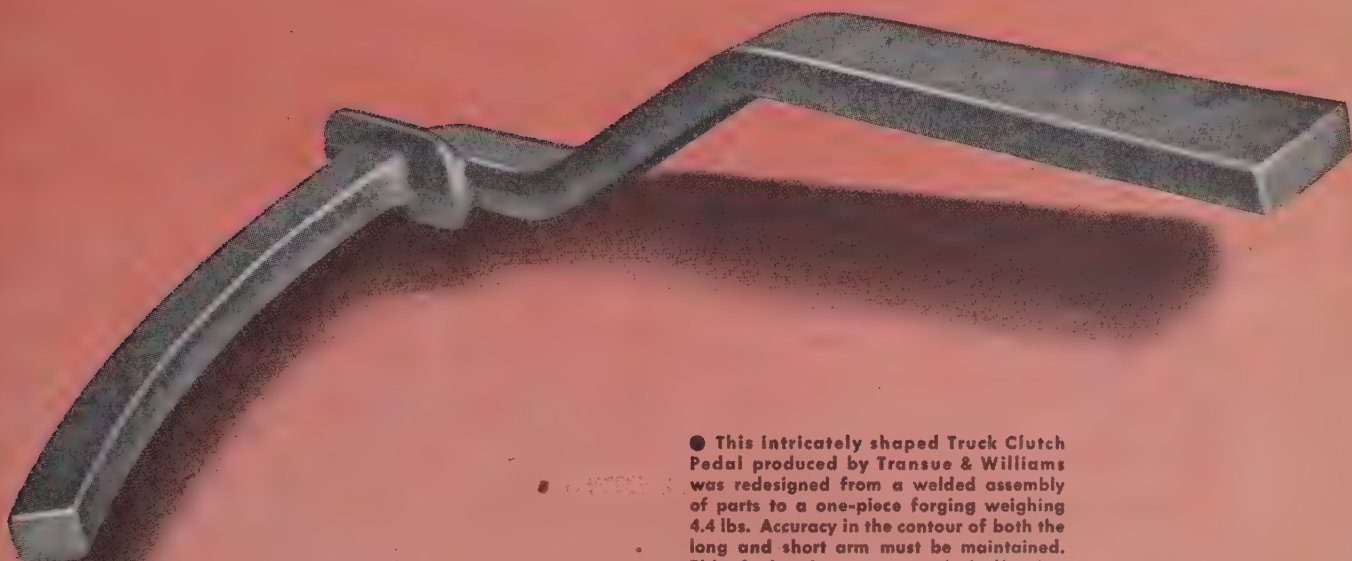
Despite a partial return to a buyers' market, tractor producers indicate that the steel shortage continues to be a handicap. Some implement plants, located in outlying areas, had been practically cut off from their steel sources even before recent f.o.b. developments. Items like steel plow discs have been particularly difficult to obtain, it is reported.

What the tractor producer's experience appears to demonstrate is that the return to a buyers' market does not necessarily mean that a producers steel supply problems are ended. On the contrary, pinches will continue to occur at scattered points along the supply lines, thereby extending the manufacturer's problems even in the face of partial plenty.

PACKAGED HOUSES: Here is a specially designed trailer truck for transporting Lustron houses. All the components are fitted into the engineered compartments of the trailer in such a way that those to be handled first in erection on the site are the first to come off the truck. Components of the house, walls and ceilings, are porcelain enameled steel with plumbing and wiring incorporated into the section units at the factory.



TRANSUE FORGINGS



● This intricately shaped Truck Clutch Pedal produced by Transue & Williams was redesigned from a welded assembly of parts to a one-piece forging weighing 4.4 lbs. Accuracy in the contour of both the long and short arm must be maintained. This design improvement is indicative of the resourcefulness of Transue and Williams engineers.

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OVER 50 YEARS OF FORGING PRODUCTION EXPERIENCE

• **FTC still against legislation on freight absorption . . . Reasons differ . . . Court clarification anticipated . . . Mason blocked as chairman.**



within the FTC which feels that freight absorption must be permitted if competition is to be given free reign. Even this group, however, does not think that legislation by Congress is the answer. They express the view that explicit legislation cannot be written to cover all types of pricing systems without endangering the basic antitrust statutes. Stated briefly, this theory holds that it is the administrators of a law, in this case FTC, who finally put into practice the terms written into law by the Congress. It is the administration of the laws under which FTC operates that has created the problem now awaiting solution, for it is clear even to the layman that FTC attorneys have twisted out of all reasonable proportion Congressional intentions in such laws as the Robinson-Patman Act. New terms and definitions in the law would only give future FTC officials more game to shoot at, according to these sources.

As an alternative, the moderate thinkers within the Commission feel that the clarification should come from the Commission or the Supreme Court. They further believe that this is exactly what will happen.

The Court will soon have an opportunity to tell industry whether the present widely-accepted interpretation of the Cement decision is correct, in other words, has all freight absorption been outlawed?

THIS opportunity arises out of the Rigid Conduit case, in which the Circuit Court upheld a Commission order which in two separate counts found the Rigid Conduit industry guilty of using a basing point system and absorbing freight. The industry was adjudged guilty if use of this method of pricing was on an individual basis and, in another count, as part of a conspiracy.

It is this conflict that the Supreme Court has been asked to resolve and it is most unlikely that the case will not be heard. If the Court's decision results in amending the FTC order so that freight absorption is illegal only as part of

a conspiracy, and the Pittsburgh Plus order is also amended permitting U. S. Steel to absorb freight, certain FTC officials feel that the whole delivered pricing mess will evaporate overnight. There would be no need for legislation or further investigation by Congress, according to these sources.

On the other side of the fence, the die-hard f.o.b. mill theorists might be side-tracked in their crusade but they will go down fighting. Most recent example of this die-hard attitude on the part of some of the Commissioners had to do with the selection of a Commission chairman. The Commission chairmanship has rotated among the five members on a seniority basis for about 30 years, with the new chairman taking over on January 1. This year the chairmanship was slated to go to Lowell B. Mason, a Republican, and most outspoken critic of the Commission's stand on delivered pricing.

But, this is not the case and Mr. Mason is now serving as Acting Chairman since he has been the first Vice-Chairman.

OFFICIALLY, the Commission issued the following statement:

"Chairman Robert E. Freer having resigned as a member of the Federal Trade Commission . . . consideration has been given to choosing a chairman to succeed him. Commissioner Garland S. Ferguson is absent from the country on special government business, and with the resignation of Chairman Freer, only three Commissioners who will serve in 1949 are present at this time. The Commission has decided, therefore, not to choose a chairman until all members are present."

Sounds logical, but to those in the know it is really just so much nonsense, since in the past, selection of a chairman has been a mere matter of form, the post falling to the next member in line on a rotating basis.

Real reason behind the postponement appears to be Mr. Mason's stand on the delivered price question—a position diametrically op-

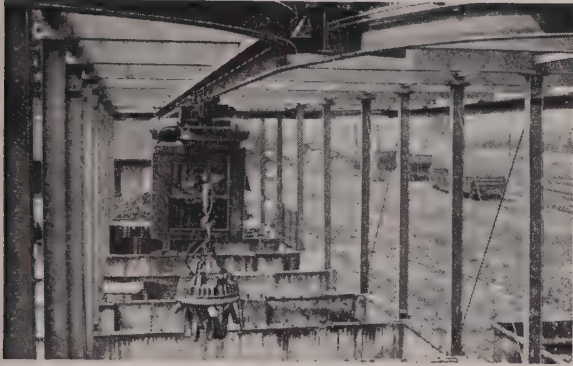
WASHINGTON—The Federal Trade Commission is now more than ever on the defensive in its fight to outlaw delivered pricing systems. Nonetheless, introduction of legislation by Senator Johnson, D., Colo., designed to permit freight absorption when not part of a conspiracy, appears to have changed not one iota the views of the Commission in regard to legislation which would end the confusion that has existed since the Supreme Court decision in the Cement case.

In other words, despite divergent views within the Commission there is still almost unanimous agreement that legislation of any sort is not the answer. The fact that the first such bill to be introduced was thrown in by an Administration stalwart appears to have made little difference to those in the Commission who have for more than 20 years toiled diligently to foist universal f.o.b. mill pricing on the American economy.

In all fairness, however, it must be pointed out that there is a group

MOVE HEAVY LOADS ON MONORAIL

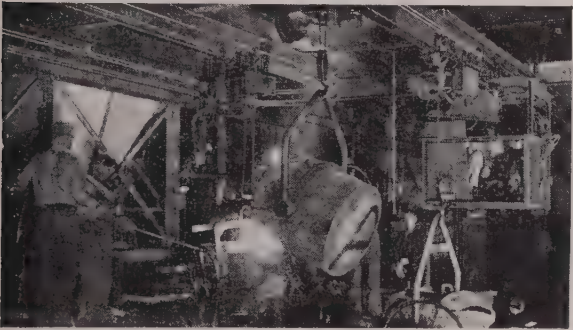
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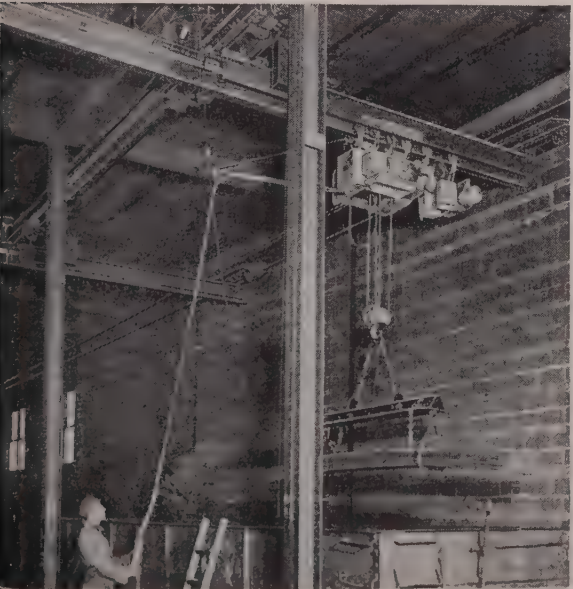
Saves \$25.00 per car unloading pig.



Saves 32c per ton handling rod.



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Tough jobs to handle are naturals for Mono-Rail. Any American MonoRail system increases plant capacity and production pace, conserves skilled labor, reduces damage and accidents and SAVES YOU MONEY.

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THE IRON AGE, January 13, 1949—77

posed to the rest of the Commission.

For example, the report of the Commission recently delivered to the Congress had nothing to say on this important problem. Mr. Mason's minority report, however, had the following to say:

"The present confusion of the law resulting from the recent orders and opinions in the Cement, the Rigid Conduit, Car Products, and Salt Cases is such that producers in many cases impose hidden price raises on the public. They do this on the grounds that they want to be certain they are not violating the law as to freight absorption in the above cases. The cumulative effect of these decisions has given validity to the excuse for moving toward an exclusive f.o.b. mill basis. I believe this passing on to the distributor of a cost which in many cases has been heretofore absorbed by the producer, creates unwarranted price raises in the consumer market. Congress should determine whether this hidden price raise effected through f.o.b. mill selling should be required, or whether a seller should legally be permitted to absorb freight sys-

tematically to meet competitors' prices."

MR. MASON further asks Congress to legislate out of existence the Commission's authority to hold knowing or conscious parallel action illegal, regardless of the conspiracy issue, as well as the Commission's power to issue orders on a finding of "reasonable possibility" of injury to competition. He also repeats his recommendations for a strengthening of the trade practice conference procedure and a

more stringent judicial review of Commission orders.

Quite obviously Mr. Mason is not going to find any strong support for such views within the Commission, and it appears that certain of the Commissioners are not anxious to have Mr. Mason speaking as the Commission Chairman on such matters. The situation will probably remain as is until after the President appoints the fifth Commissioner, who must be a Republican, since the three other incumbents are Democrats.

Railroads Market 15 Pct Scrap Consumed; More Seen for 1949

Washington

• • • Railroads of the United States in 1948 marketed approximately 4,350,000 gross tons of iron and steel scrap, according to a survey by the Institute of Scrap Iron & Steel, Inc., of Washington.

This scrap, which comprised obsolete and worn out rolling stock, track material, and structures,

represented about 15 pct of all the scrap consumed by steel mills and foundries in 1948 in producing new steel and castings or added to inventory.

Measured by the mileage of the railroads, the scrap they generated in 1948 averaged almost 20 gross tons for every mile. This was an increase of about 5 pct over 1947, when less new rolling stock and track material was available for replacements.

The Scrap Institute's survey indicates that in 1949 the railroads will offer slightly more scrap than in 1948. A majority of the roads estimate their scrapping programs at about the same level as 1948, but several important carriers disclosed that it will be only this year that their big post-war replacement program can get under way.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Steady Pace Reported For Factory Products

Washington

• • • Daily average factory sales in November ran at the same rate as in October, the Office of Business Economics reports. The dollar volume was placed at \$18.2 billion, 10 pct above a year ago.

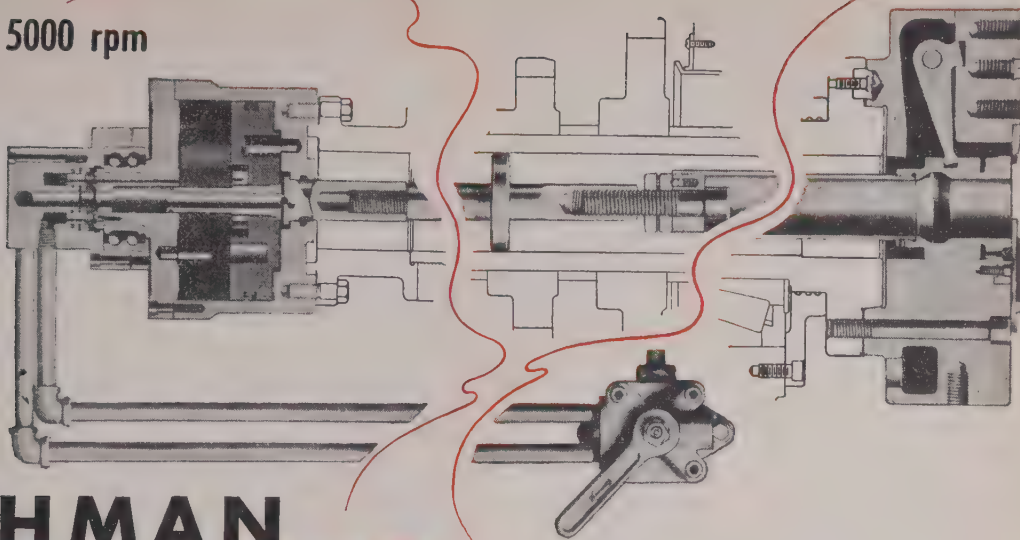
An increase was evident in automobiles and electrical goods but a decline, largely seasonal, was noted in the building materials groups.

With production continuing at a high rate, the result has been a small increase of a quarter billion in manufacturers inventories which were reported on Dec. 1 as standing around \$14.5 billion in durable goods.

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The high r.p.m. of air cylinders for control of chucks, mandrels and other air operated devices mounted on spindles, posed a problem that Cushman engineers have solved . . . and we now present the new Cushman High Speed Air Cylinders for use with Cushman Power Chucks . . . and with other makes as well.

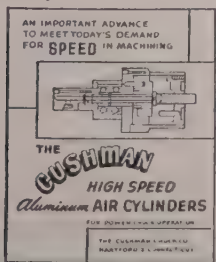
Precision aluminum alloy construction lowers weight to a minimum . . . gives low flywheel effect . . . long service.

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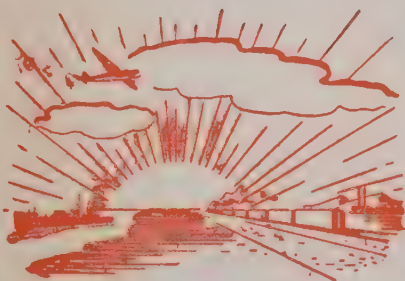
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WRENCH OPERATED CHUCKS
Write for Catalog 63 and Bulletins

• Imports of pig and scrap believed to have affected price . . . Northwest mill resumes rolling . . . Major expansion announced for Utah acid plant.



permits to be exported is reportedly off grade.

Hubert Long, an importer just back from China, Japan and the Philippines, reports that all industry in China has adopted a "wait and see" attitude to determine if the Communists will take over and nullify investments. Some activity is continuing in the scrapping of war-damaged ships, however, and there is a brisk market for plate, he says.

In Japan, Mr. Long says the iron and steel business is making a determined comeback despite many handicaps. It operates under strict U. S. Army regulations designed to prevent any form of war material manufacture. Sheets, bars and plate are being turned out.

Ore is being brought in from China and the Philippines and some from the U. S. according to Mr. Long, and scrap is plentiful as a result of war-time activities by Navy and air force bombers.

Mr. Long said carbon scrap is being retained there, but he was able to export 18,000 tons of alloy scrap which he has sold to dealers in San Francisco. Comparatively little alloy scrap remains, however, according to this importer.

Scrap in the Philippines is plentiful but so scattered as to make it difficult to compress and ship here economically, he added.

Results of a government scrap and steel plant survey to be made in Japan during next 3 to 6 weeks will be awaited with considerable interest by all West Coast steel producers. The presence of two West Coast men well known in steel circles gives local producers some hope that the local situation will receive at least a just share of attention.

MARSHALL SHAPIRO, president of the California Metals Corp., Oakland, Calif., is one of the leading figures in the scrap business on the Coast and has an intimate knowledge of the

situation. Ronald Scott Coulter, combustion engineer for all three plants of the Bethlehem Pacific Coast Steel Corp. in the West is considered an expert in this field and should prove valuable in determining present steel capacities in Japan.

While the scrap situation in the East is improving and prices are declining, western producers are still concerned about the shortage. While some inventories admittedly are at a high point, the long range prospects are not too encouraging. If this government commission determines that considerable quantities of low carbon scrap is available in Japan, it is entirely possible that price adjustments will have to be made by West Coast buyers to bring this material to local ports rather than to permit it to move through the Canal to the eastern seaboard.

SEATTLE—Northwest Steel Rolling Mills resumed rolling operations on Jan. 10, after having been down 3 weeks to allow the electric furnace to build up the ingot supply. The firm's operation was at bedrock so far as ingots were concerned when its mill stopped on Dec. 23.

Each year the company stops rolling for a 2-week period during the summer and winter to build up its inventory of ingots. This year marks the first time it was necessary to curtail operations for 3 weeks.

Company officials are hopeful that the situation will develop through the following months whereby the firm can get ingots from outside sources and thus have a continuous operation. They also believe that the scrap market will soften sufficiently so that the operations can be expanded in the near future.

At this time, however, officials decline any comment on expansions under consideration, or new facilities. "They are still in the talking stage," they report.

LOS ANGELES—Although imports are on a highly irregular basis, some pig iron and scrap have been arriving in this area since the settlement of the maritime strike and have contributed to lowering the price of cupola cast here to the \$40 to \$50 bracket with much of it selling for about \$47 a gross ton.

Importers returning from Japan, China, India and the Philippines indicate that actually, however, only comparatively small and irregular shipments will be forthcoming.

Some pig iron recently was brought in from India by Atkins-Kroll Co., but W. A. Ashman, official for the importing firm, reports that rigid government restrictions in India make purchasing difficult there. There still is a large demand for steel in India and other Asiatic countries.

Although the price varies with the shipment, one manufacturing company reported buying pig from India for "slightly more than the Geneva price at Los Angeles, but below that of Kaiser here." Most of the pig the Indian government



You may have *plenty* of extinguishers . . . BUT are you *sure* they're ready for action?

Periodic inspection and maintenance, recharging when necessary . . . these steps are essential to keep your fire extinguishers ready for *immediate* action.

Perhaps this involves a serious drain on the time of your personnel—who may be urgently needed for productive tasks. If so, here's a suggestion.

Why not let your Kidde representative take on the job?

He is prepared to offer you, on an annual contract basis, a comprehensive service covering all phases of fire-extinguisher service. He will call at regular intervals, to check the condition of your equipment, and

will let you know immediately when recharging and repairs are needed. He has full facilities for the actual handling of the recharging or repairs.

Such an arrangement can help you, in other ways, to make most effective use of your fire extinguishers. As a specialist in fire-fighting, your Kidde representative may be able to *locate* your extinguishers to better advantage. Perhaps one extinguisher is hard to reach. Perhaps two types of extinguishers would give better protection if their positions were interchanged. You'll find such a service well worthwhile—why not look into it?



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Northwest, unlike most other firms in this area, has not felt any general softening in the scrap market, but they expect it to come soon. Other concerns continue to report a softer market and that dealers are anxious to move their scrap.

No price changes have come yet, but the buyers continue to believe the prices will drop very shortly. One buyer reported that he believed the price would be about \$2 per ton below the quoted prices if any large transactions were made at this time. However, he did not know of any instances where scrap was selling below the quoted prices.

Foil Mill Expected Soon

Oakland, Calif.

• • • The Permanente Metals Corp. produced 125,000 tons of aluminum in 1948 according to D. A. Rhoades, vice-president and general manager. Production in 1947 amounted to 92,500 tons.

Permanente is expected to get its aluminum foil mill imported from Germany, into operation within the next 90 days at Permanente, Calif., and an aluminum rod, bar and wire mill at Newark, Ohio, is scheduled to begin producing late this summer.

Can Company Faces Delay

Portland

• • • Because of delays in delivery of can making machinery, the recently completed \$1,250,000 plant of the Continental Can Co. here is being used temporarily for warehousing.

Gets Ship Repair Award

Portland

• • • A contract for the repair and maintenance of 40 vessels in the Pacific Reserve Fleet at Tongue Pt. Naval Base, Astoria, Ore, has been awarded to the Willamette Iron & Steel Co.

Stove Maker Still Optimistic

Los Angeles

• • • If more steel is to be made available by the failure of utility goods manufacturers to use their full ordered quotas as some have forecast, it probably will be in small amounts, A. T. Simmons, purchasing agent for O'Keefe &

Merritt Co., stove manufacturers copped here.

While admitting that sales of stoves, refrigerators and similar items are off some, Mr. Simmons believes the drop to be only seasonal.

Some cutbacks may be seen with new companies or those with "none-quality" goods, however, Mr. Simmons believes.

Using his own company as an example of the stable manufacturers, Mr. Simmons says that production now is at a pace of 360 a day there even with buying off some. "Our plans are made on the basis that demand will return," he said.

O'Keefe and Merritt uses about 12,000 tons of steel annually.

To Take Industrial Survey

Los Angeles

• • • In an effort to determine the thinking of its members on the matter of price policies, freight absorption and what type of legislation, if any, they prefer in this regard, the Los Angeles Chamber of Commerce has undertaken a mail survey.

Kenneth T. Norris, chairman of the steel committee of the Western States Council, states that the Senate Committee on Trade Policies, headed by Senator Homer T. Capehart is being urged to hold hearings somewhere on the West Coast to learn the views of western businessmen on the subject of price policy and legislation. The results of the survey now being conducted will form the basis of representation for the committee, it is stated. This city has been suggested as the site for the hearing, but local businessmen have expressed a willingness to go anywhere on the Pacific Coast if only one meeting of the committee can be held in the West.

Among other questions, to which the survey seeks answers are: "Do you normally absorb transportation costs to meet competition in some markets? What is the approximate percentage of your gross sales represented by such absorption? Considering all factors, including your purchase of material, would the sale of your product f.o.b. to your place of business (your competitors selling f.o.b. their place of business)—give you a competitive advantage? Place you at a competitive disadvantage, or have no effect?" A reaction to the following

principle is also requested: "It shall not be considered illegal for a seller to absorb transportation costs in his price in order to meet competition in any market in which he chooses to compete as long as he does not act in collusion with others through such absorption to restrain or destroy competition."

Utah Plant to Expand

Salt Lake City

• • • The Garfield Chemical Co. has announced a \$6,250,000 expansion program to increase sulfuric acid production at its Garfield, Utah, plant. Construction is scheduled to start as soon as engineering details are worked out and the project will be completed within 2 years.

In addition to increasing acid production, the project is expected to eliminate the smelter smoke problem which has been a source of numerous damage suits in the past. Sulfur gases which cannot be converted into acid will be discharged at high temperatures from taller smokestacks. It has been found that much better dispersion can be obtained if the gases are heated before being released into the air.

Demand for sulfuric acid has been greatly increased in this area by expansion of the steel industry, oil refining and manufacture of commercial fertilizer. A major consumer is expected to be the J. R. Simplot Fertilizer Co., which purchased the war surplus Kalunite plant here for conversion to fertilizer production.

The Garfield Chemical Co. is jointly owned by American Smelting & Refining Co. and Kennecott Copper Corp.

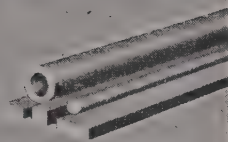
Kaiser After Steel Record

Fontana, Calif.

• • • With its seventh openhearth now in operation Kaiser Co. Inc., Iron & Steel Div., looks forward to a 1949 ingot production of 1 million tons after having set a record in 1948 of 853,000 tons. 1949 production with 796,000 tons. A total of 650,000 tons of finished steel was shipped in 1948.

The tonnage record for 1948 was made under the handicap of having the 1200-ton blast furnace down for relining for 63 days after having been in operation for 5½ years and producing more than 2 million tons of pig.

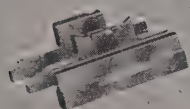
TALIDE METAL MEETS
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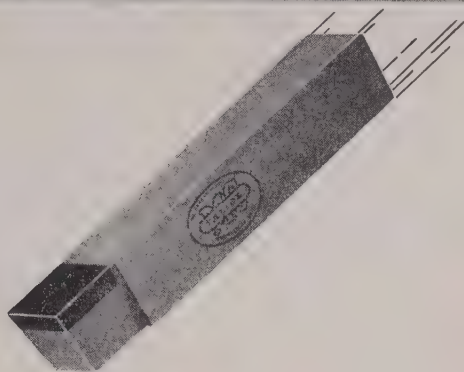


ROLLING MILL WORK ROLLS

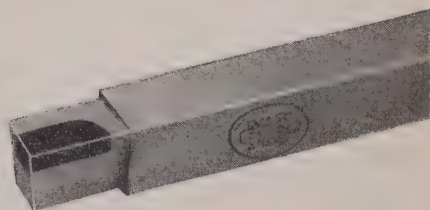
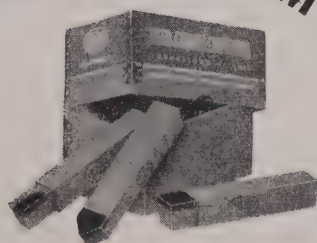
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PERSONALS

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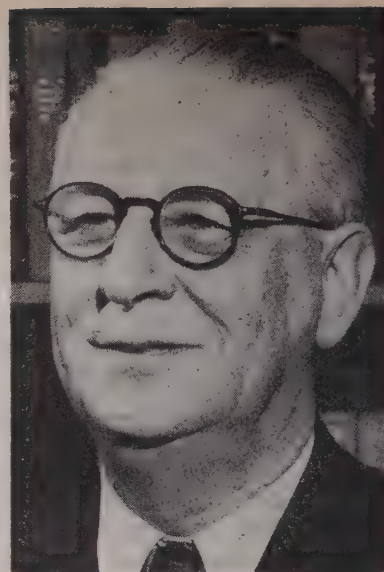
• **C. S. Gotwals** has been appointed quality manager of all SKF Industries, Inc., plants in Philadelphia, Shippensburg, Pa., and Hornell, N. Y. **Charles R. Scott, Jr.**, in charge of the machining division since 1946, has been named to succeed Mr. Gotwals as superintendent. **W. F. Shedinger** has been appointed to direct operations of the machining division in addition to his duties as head of the ball division.

• **Henry W. Johnson** has retired as vice-president in charge of manufacturing, De Laval Steam Turbine Co., Trenton, N. J. He continues as a director and a member of the executive committee. **C. Richard Waller** has been named vice-president and director for engineering. **H. G. Bauer** has been elected vice-president and executive engineer. **J. P. Stewart**, manager, commercial sales division, has been elected a vice-president. **W. A. Reynolds** has assumed responsibility for the development and merchandising of new small products in addition to his duties as manager of the IMO Pump and Worm Gear divisions. **W. A. Neumann, Jr.**, has been named controller.

• **A. C. Belles** has been appointed assistant to the manager of operations, Union Drawn Steel division, Republic Steel Corp., Cleveland. Mr. Belles, formerly superintendent of the Beaver Falls, Pa., plant of Union Drawn, has been succeeded by **T. M. Girdler, Jr.**, who had served as assistant superintendent.

• **B. C. Gould** has been elected president, the Murray Corp. of America, Detroit, succeeding **C. W. Avery**. Mr. Avery continues as chairman.

• **Lawrence N. Kaiser** has been named superintendent at the Dunkirk plant of the American Locomotive Co., succeeding **Eugene F. Murphy**. **Ralph H. Redline** has been named acting plant maintenance engineer, succeeding **Edward G. Applegate**, plant engineer, who resigned.



CLIFFORD W. LORD, vice-president, U. S. Steel Supply Co.

• **Clifford W. Lord** has been elected vice-president in charge of all Pacific Coast warehouses of United States Steel Supply Co., Chicago, warehousing subsidiary of U. S. Steel Corp. Prior to his election, Mr. Lord served as district manager of Los Angeles and San Francisco warehouses. He has been associated with the company since 1947, having formerly been employed by Columbia Steel Co.

• **A. H. Lundius** has been named plant manager of the Clark Township (N. J.) plant of Hyatt Bearings division of the General Motors Corp., Harrison, N. J. Mr. Lundius succeeds **J. C. Henny**, who has retired. Mr. Lundius has been at the Harrison plant since 1935. Mr. Henny joined Hyatt in Harrison in 1915.

• **Otto T. Englehart**, president of the Beryllium Corp., Reading, Pa., has assumed the duties of general manager. **B. Maxwell Staley**, formerly general manager, has resigned. **Theodore R. Blessing** has been named acting purchasing agent, succeeding **Warren E. Ringler**, who died. **Frank Spitale** has been named research metallurgist.

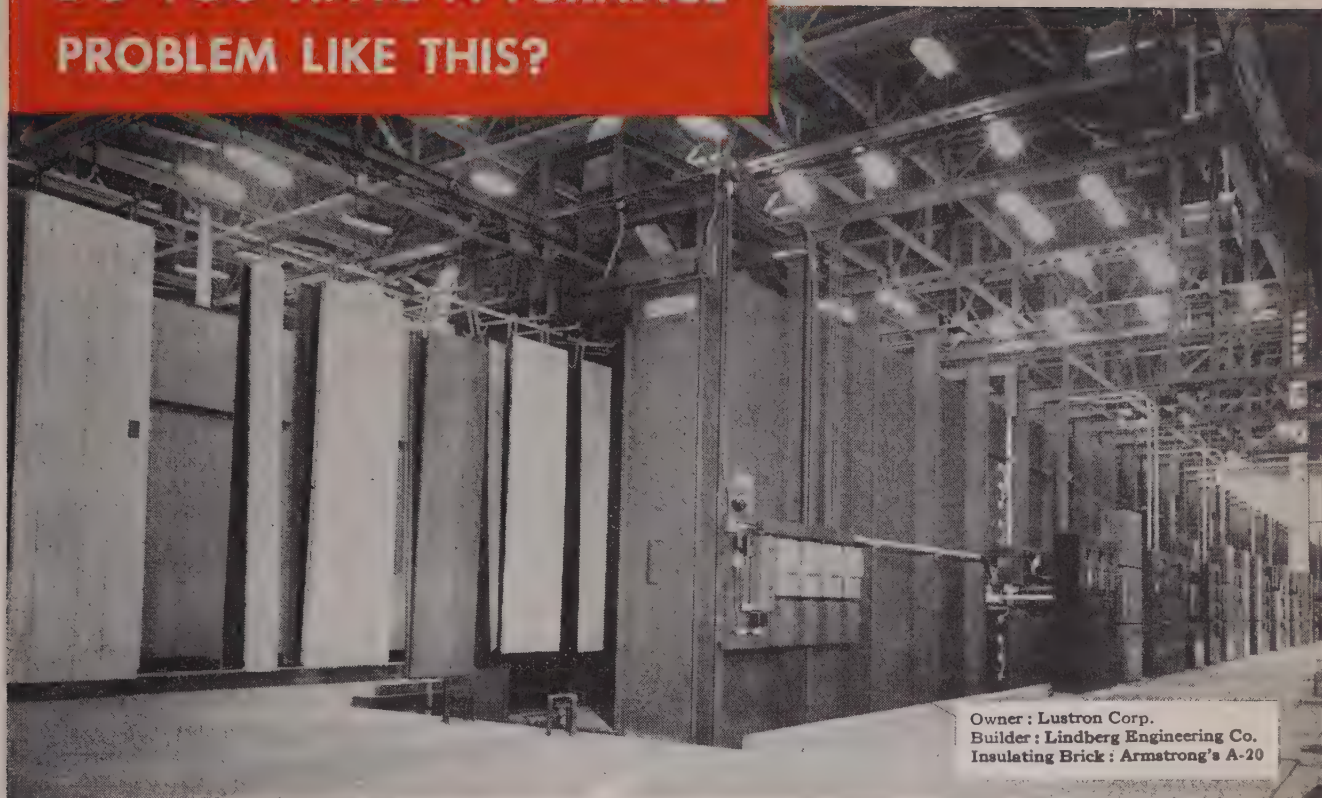
• **Sam Insull, Jr.**, now a corporate vice-president, has been designated head of the newly-formed Electric Div., Stewart-Warner Corp., Chicago. Mr. Insull joined Stewart-Warner in 1947 as assistant to the president.

• **William Seymour, Jr.**, has been elected vice-president and **Thomas G. Miller**, secretary, Joseph T. Ryerson & Son, Inc., Chicago. Mr. Seymour has served the Ryerson organization for 31 years in plant operations and labor relations work and has been assistant vice-president since 1945. Mr. Miller joined the company in 1938 and has been assistant secretary since 1946.

• **Harry A. Fohl** has been named assistant to the chief engineer, Lukens Steel Co., Coatesville, Pa. Mr. Fohl has been master mechanic since 1945. **Reuben G. Uhler**, who has held the position of assistant superintendent of mechanical maintenance since 1945, has been named superintendent of mechanical maintenance. **Malcolm B. Antrim**, electrical engineer since 1945, has been named assistant superintendent of electrical maintenance, and **Clifford W. Burdick** has been made assistant electrical engineer. He has been junior electrical engineer since early last year.

• **Floyd Rose** has retired as chairman of the board of Firth Sterling Steel & Carbide Corp., Pittsburgh. Mr. Rose has held that office since 1945. He continues as an active member of the board. **Michael N. W. deBerardinis** has been named manager of sales promotion and advertising. Mr. deBerardinis had formerly been connected with Westinghouse Electric Corp.

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Builder : Lindberg Engineering Co.
Insulating Brick : Armstrong's A-20

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Steel panels used in building Lustron Homes go through giant electric vitreous enamelling furnaces which fire the porcelain finish at temperatures to 1600° F. To prevent excessive heat losses, the open ends of these furnaces are curtained with blasts of air. In the critical heating zones, efficient Armstrong's Insulating Fire Brick, backed up by high temperature block, help maintain exact temperatures with minimum consumption of electricity.

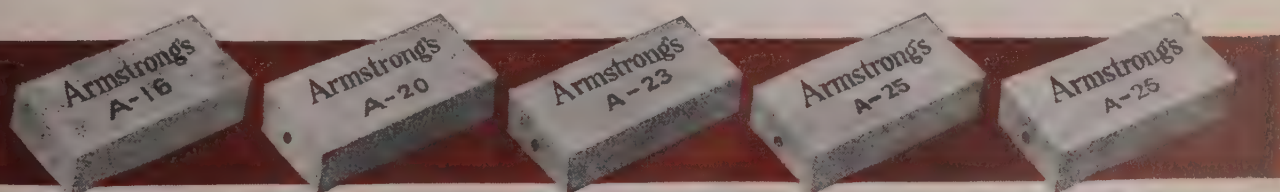
Lindberg Engineering Company of Chicago built the furnaces shown above with the electric heating units mounted on 9" refractory brick. Behind these brick are 9" of Armstrong's A-20 Insulating Fire Brick.

Thirty-two different temperature zones are efficiently maintained in the furnaces. They pre-heat, fire, and then gradually cool the panels as they move from one end to the other. Tempera-

ture is controlled vertically as well as horizontally to assure even heat treatment.

The precisely uniform dimensions of Armstrong's Brick make it possible to erect heat-tight walls to almost any desired height or length. And because of their high insulating efficiency and great strength and spalling resistance, these brick can be counted on for long and dependable service. These qualities distinguish all five types of Armstrong's Brick, rated for temperatures from 1600° to 2600° F.

Whenever you encounter the need for insulation to improve the operation of any process using high temperatures, it will pay you to consider the use of Armstrong's Insulating Fire Brick. Talk over your problem with an Armstrong engineer. Just call the nearest Armstrong district office or write direct to Armstrong Cork Company, Industrial Insulation Department, 4901 Mulberry Street, Lancaster, Pennsylvania.



ARMSTRONG'S INSULATING REFRACTORIES



MAYNARD B. TERRY, vice-president, American Brakeblok Div., American Brake Shoe Co.



WALTER A. JAYME, general superintendent, Gary Works, National Tube Co.

• **Maynard B. Terry** has been appointed vice-president of the American Brakeblok Div., American Brake Shoe Co., New York. Since joining the Brake Shoe Co. in 1943, Mr. Terry has served in various sales capacities and had been general sales manager previous to his new appointment. He continues his headquarters in Detroit.

• **J. R. Cameron** has returned to the Norge Div., Borg-Warner Corp., Detroit, as assistant to the director of manufacturing. Mr. Cameron joined Norge in 1927 and left the company in 1944.

• **John E. McKeen** has been elected executive vice-president, **Fred J. Stock**, vice-president, sales, and **John L. Davenport**, vice-president, production, Chas. Pfizer & Co., New York. **John J. Powers, Jr.**, has been named secretary.

• **E. A. Jack** has retired as general traffic manager for the Aluminum Co. of America, Pittsburgh, and has been succeeded by **W. B. Shepherd**. Mr. Shepherd joined Alcoa in 1917 and has been assistant general traffic manager since 1933.

• **William M. Hamilton** has been appointed executive vice-president of General Steel Products Corp., Flushing, N. Y.

• **Walter A. Jayme** has been appointed general superintendent of the Gary Works of National Tube Co., Pittsburgh, a subsidiary of U. S. Steel Corp. He had been assistant general superintendent of the plant since 1947. Mr. Jayme started with the corporation 35 years ago.

• **Francis J. Lantry** has been elected president of M. H. Treadwell Co., Inc., New York, succeeding **J. Schuyler Casey**, who died.

• **Norman H. Balaam** has been named assistant to the vice-president and general manager of Kaiser Fleetwings, Inc., Bristol, Pa. Mr. Balaam had formerly been associated with Columbia Steel Co. and later with Kaiser Co., Inc.

• **Milton J. Steffes** has been made general sales manager of the Super Tool Co., Detroit. Mr. Steffes has been with the company for seven years in the capacity of field engineer and more recently in charge of the carbide tool research program. Mr. Steffes succeeds **Harold E. Berry**, who has been obliged to curtail his activities and is now serving as advertising manager as well as consultant in sales.

• **Howard G. Hammer**, founder and first president and treasurer of George J. Hagan Co., Pittsburgh, has retired after 41 years in the furnace business.

• **George A. Daniels** has been appointed secretary and treasurer, Hydraulic Press Mfg. Co., Mount Gilead, Ohio, succeeding **W. C. Batchelor**, who has resigned after 33 years of service. Mr. Daniels has served the company as controller for the past two years. **Philip J. Lindner**, formerly chief engineer of the company, has been appointed head of the Detroit branch sales office.

• **Arthur G. Lohse** has been appointed vice-president in charge of the New York office of Iron & Steel Products, Inc., Chicago, filling the vacancy caused by the retirement of **David Newhall** and **John S. Wood**. **Arthur D. Huff, Jr.**, has been named to assist Mr. Lohse.

• **William N. Bartleson** has been designated superintendent of the Chester, Pa., works of Harbison-Walker Refractories Co., Pittsburgh. He has been assistant superintendent since 1942. **Joseph R. Parsons** has joined the company as a research engineer at its Hays, Pa., laboratory. For many years Mr. Parsons has been associated with U. S. Gypsum Co.

• **Walter P. Carroll** has been appointed manager of the metal department of National Lead Co., New York, succeeding **C. A. Geatty**, who retired. He joined the company in 1910 and had formerly been manager of the Chicago Branch. **George B. Coale** has been named chief engineer of National Lead, succeeding **Andrew Mayer**, who retired. He joined the company in 1935 and formerly served as assistant chief engineer. **Daniel D. Roberts**, who formerly served as manager of the Portland Div. of the west coast branch, has been named Pacific Coast branch manager, succeeding **James L. Caruth**, who died. **C. A. Sondhaus** has been appointed assistant manager of the branch. He was formerly director of industrial relations. **K. C. Specht**, assistant manager of the Southern Div. of the Pacific Coast branch, has been named manager, succeeding **H. S. Irwin**, who retired.

• **Paul E. Gerhard** has retired from active business as sales representative at Philadelphia for the Industrial Div., American Steel Foundries, Chicago.

• **J. L. Gilliam** has been appointed implement purchasing agent for **Harry Ferguson, Inc.**, Detroit. Prior to joining Ferguson in 1945 Mr. Gilliam served with **Standard Steel Co.** **Dave Milligan** has been named assistant director of procurement in charge of implements. In 1943 Mr. Milligan joined Ferguson as director of research. **Marshall E. Munroe** has been named assistant director of procurement in charge of tractor components. Mr. Munroe joined Ferguson as a factory representative and had formerly been connected with **United Fruit Co.** and **E. J. Emanuel & Co.**

• **Harold F. Smiddy** has been elected a vice-president of **General Electric Co.**, Pittsfield, Mass. Mr. Smiddy now serves as general manager of the chemical department.

• **Terry P. Cunningham** has been named advertising and sales promotion director for **Sylvania Electric Products, Inc.**, New York. Mr. Cunningham has been associated with **Sylvania Electric** and subsidiaries since 1942. **Edward P. Atcherley** has been appointed northwest division manager of renewal tube sales. Mr. Atcherley has his headquarters in Seattle.

• **Edward L. Dreyer** has been elected vice-president, **Adamas Carbide Corp.**, Harrison, N. J.

• **John A. Sargent** has been named executive vice-president, **Diamond Alkali Co.**, Pittsburgh. Mr. Sargent advances to his new position from that of vice-president of finance, which he held since 1947. He joined the company as treasurer in 1946.

• **Joseph Tucker** has been elected senior vice-president of the **Lustron Corp.**, Columbus, Ohio.

• **W. J. Edmonds** has been named general traffic manager for **Granite City Steel Co.**, Granite City, Ill., succeeding **John B. Green**, who resigned. **M. F. Schweppe** has been appointed traffic manager.

• **Clare C. Bostedor** has been named director of programming and production control for **Lincoln-Mercury Div.**, Ford Motor Co., Detroit. Mr. Bostedor joined Ford in 1922.



BANKS E. EUDY, manager, Stainless Steel Products Sales Div., American Steel & Wire Co.

• **Banks E. Eudy** has been named manager of the newly-formed Stainless Steel Products Sales Div., American Steel & Wire Co., Cleveland. Mr. Eudy joined the stainless division of **Carnegie-Illinois Steel Corp.** in 1936 and in 1947 was transferred to the American Steel & Wire Co. **C. Richard Horwedel** has been named assistant manager of the new division of the Wire Co. Dr. Horwedel joined the company in 1930.

• **R. S. McNamara** has been appointed controller, and **Victor Z. Brink** has been named general auditor of **Ford Motor Co.**, Dearborn, succeeding **M. E. Sheppard**, who has resigned. **J. E. Lundy** has been named director of financial analysis. **G. E. Altmansberger** has been made director of budgets and costs, and **E. A. Eberle** has been appointed chief accountant.



DAVID M. STRAUCHEN, manager of a new special products division, Cincinnati Milling Machine Co.

• **David M. Strauchen**, general shop superintendent since 1931, has been made manager of a new special products division of **Cincinnati Milling Machine Co.**, Cincinnati. **Alfred T. Blackburn**, who has served in various capacities in the shop and production control division since 1930, becomes general shop superintendent. **George W. Binns**, who has been with the company since 1913, heads up new developments. **John B. Elfring**, who has held many responsible positions in his 34 years with the company, has been promoted from head of the tool design department to manager of production control, time study, planning and tool design. **Harold Thomas** has been made head of tool design, having formerly served as assistant, and **Fred Miller** advances from supervisor of Plant No. 2 to assistant general superintendent.

(CONTINUED ON PAGE 110)

OBITUARY...

• **William H. Lewis**, 81, died recently. Mr. Lewis had been identified with the steel industry since 1883 when he started his career with **Carnegie Steel Co.** He supervised construction of the **Aliquippa** plant of **Jones & Laughlin Steel Corp.**, later becoming superintendent there. Mr. Lewis retired in 1946.

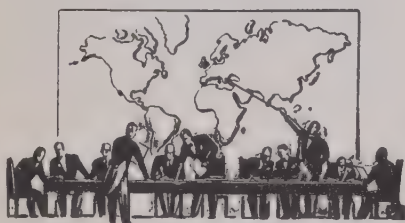
• **Marvine Gorham**, 78, Buffalo representative of **Michigan Steel Casting Co.**, died Dec. 22.

• **Albert R. Pfeltz**, 62, vice-president, **American Can Co.**, New York, died Jan. 4.

• **Theodore W. Robinson**, 87, former vice-president, **Illinois Steel Co.**, Chicago, and chairman of the board of the **Ditto Corp.**, died Dec. 30. Mr. Robinson retired in 1932.

European Letter . . .

• Key to French economy is courageous, honest and firm government . . . Inadequacy of physical production not responsible for deterioration of finances . . . People now living on their capital and other nations' bounty.



LONDON — The French people must by now be hardened to being told that they stand at the crossroads between the path of economic stability and prosperity and the path that leads to economic chaos and political weakness. Save for the briefest intervals, the economic history of France for many centuries past has been one of chronic monetary instability, deteriorating at intervals into sheer insolvency. So recurrent have been the crises that the average Frenchman has difficulty in any longer taking his national finances seriously. Perhaps, over the centuries, monetary instability has done less ultimate harm to France than might be supposed. What could be called the ordinary crises come and go without leaving much permanent trace. But every now and then there is an extraordinary crisis that threatens to bring down, for a time, the structure of the French state. By all the signs and portents, this is one of those occasions. For what is happening at present is not merely that the French Government is living beyond its means—that is almost a normal state of affairs—but that France itself is consuming wealth at a considerably faster rate than it is being created. The French people are liv-

ing on their own capital and on other nations' bounty. Neither process can go on very long. But if they stop before French efforts have put something in their place, the result can only be a sharp deterioration in the national standard of life.

The facts that are needed to document this diagnosis are set out, with his customary lucidity and force, by M. Jean Monnet in the third interim report on the progress of the plan with which his name is associated, which was issued in Paris last week. The report purports to cover the plan of investment during the first six months of 1948; but in fact it is a cogent argument on the crisis, in which France now finds itself, and a summons to make the effort of political courage necessary to emerge from it.

WHATEVER else may be responsible for the steady deterioration of French finances, it is not any inadequacy of physical production. The level of output, it is true, was very low at the time of liberation, and even in 1946 the general index of industrial production was still more than 20 pct below the 1938 level. But the last two years have shown an impres-

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sive recovery and in the first half of this year the index stood at 114. The average for the second half of the year will have been depressed by the coal strike, but the present level of production is again considerably above the prewar figure. The most spectacular gains of the last two years have been in steel, where output has nearly reached the 1937 peak, in coal, where the 1939 peak has been well surpassed, and in the production of electricity and cement. Shipbuilding has increased fourfold since 1946 and in the middle of this year the tonnage of merchant shipping under construction in France was second in the world only to that of the United Kingdom. The darkest corner of

the production picture is in agriculture; the 1947 harvest was disastrous and that of 1948 is probably still some 15 pct below the prewar level.

M. Monnet's more immediate concern is with the creation of new fixed industrial capital, particularly in the half-dozen key industries that were singled out in his original report for special attention. Here, too, the report can tell of reasonably satisfactory progress. The value of new equipment installed in 1947 was 29 billions of francs of 1938 value and was at the annual rate of 30 billion of 1938 francs in the first half of 1948, compared with a mere 8 billion in 1938 itself. The increase in industrial equipment is not, in fact, as great as these figures would suggest, since buildings of all kinds absorbed 13 billion in 1947 and 11 billion (annual rate) in the first half of 1948, against almost nothing in 1938. Nevertheless, it is clear that some investment in fixed capital is going on. Indeed, figures in the report indicate that total gross capital creation in 1948 has been running at the rate of 24 pct of the gross national output, which is a high proportion by any standards. Indeed, the outside observer will be tempted to conclude that these figures are far too good to be true. In a state of hyper-inflation there is a great deal of conscious and unconscious consumption of capital that never gets into estimates of national income, which tend therefore to include all of the pluses and none of the minuses.

THE combined effect of the Monnet plan and of monetary inflation is probably to increase France's fixed capital and to drain its working capital. It is significant that over half of the privately financed capital investment of the last two years has been paid for with bank credit; nor can the Government's contribution be regarded as wholly derived from non-inflationary sources. Moreover, many of the basic industries are now publicly owned and running at constantly mounting deficits. It is

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politically difficult either to raise their charges or to cut their expenditure and their appropriations for maintenance of capital have proved to be far too tempting targets for the politicians. It is doubtful how far the existing capital of these industries is being maintained, and it is certainly not being maintained out of revenue. French national savings are certainly not enough to pay for the new capital creation that is going on; a complete reckoning of things seen and unseen might even show that there is, on balance, no net saving at all.

The second running sore is the budget. Under happier circumstances, France's budget would be nobody else's business. Today, however, the welfare of the 18 other European nations joined together in the European Recovery Program is linked to the French economy. What happens in Paris may well affect the standard of living in Perth and Palermo.

WHAT is happening in Paris at present is the familiar spectacle of budget-making. The government has produced proposals which do not, indeed, balance the budget but which reduce the gap between income and expenditure to a figure which the optimists can argue is non-inflationary. Unfortunately, its means

of closing the gap are politically circumscribed. Any attempt seriously to reduce expenditure would inevitably mean throwing voters out of work, and any attempt seriously to increase direct taxation, or any form of taxation on the agricultural population, would run up against the well-known obstacles that generations of finance ministers have learned to respect. All that can, therefore, be done, in effect, is to increase indirect taxes still further—which will infallibly lead to demands for higher wages, which will increase expenditure, which will prevent even the optimists from pretending that inflation will now stop. The government's initial proposals, as usual, look like being too much for large sections of the Chamber.

The theory of a current budget covered by revenue and of a capital budget covered by savings and capital receipts is unexceptionable. But in practice everything depends on whether the revenue comes in to cover the first budget and the savings to cover the other. Many French observers believe that there is more than a little optimism in the balancing of the ordinary budget; as for the capital budget, the Marshall counterpart, though it is a real source of finance, is also a temporary one, and the conditions attaching to the loan do not sound as if it is even hoped to attract

many genuine new savings. The test, in the end, will be severely practical: will the government get through the year without recourse to the banks? And since, even in the budget estimates, genuine recurring revenue covers only three-quarters of the expenditure, the answer is certainly in the negative.

YET the problems of the French economy, as national economic problems go these days, are simple. A few rough statistical comparisons will serve to put them into proportion. If the comparison is with the United Kingdom, the object is not to vaunt what has been achieved in one country or to denigrate what has been done in the other, but simply because comparison between such close neighbors is natural.

The other leak, that of the balance of payments, would be harder to stop. But again the problem looks simple alongside that of other countries. France is much more nearly a self-supporting country than Britain; foreign trade is much more marginal. At present the average Frenchman is importing about \$62 worth a year of visible goods and invisible services and paying for them with \$22 worth of his own exports. Relatively, the gap is enormous; but the imports are only some 8 or 9 pct and the exports 3 pct of the gross output. The British figures are 15 pct to 16 pct and 13 pct to 14 pct respectively. Clearly, the effort and the readjustment that would be involved for the Frenchman either in cutting down his consumption of foreign goods and services or in expanding the proportion of his own output that is sold abroad would need to be far smaller proportionately than the sacrifices and the exertions that are already being made on the other side of the channel.

That the French have serious problems to face nobody would wish to deny. But those problems are not economic; they are political. They are the problems of asserting self-control and collective authority. There is nothing wrong with the French economy that a short period of firm, honest and courageous government could not easily set right. The problem before the French people is how to give themselves such government without falling prey to dictatorship.

ART OR ENGINEERING: *This is not an artist's nonobjective canvas but the inside of Britain's first flying boat jet fighter, the Saunders-Roe A1. Here you see the exit ports for the jet exhaust. Principal advantage claimed for the A1 is its ability to operate from any stretch of water of reasonable size.*



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• **PURCHASE**—With the purchase of the government blast furnace and coke oven at Houston, the Sheffield Steel Corp. plans to construct two more openhearth furnaces in the vicinity, it is reported. In addition to the 276,000-ton furnace and similar coke oven capacity, Sheffield acquired the north and south basin iron ore beds and beneficiating equipment at Linden and Jacksonville. Supplementary to the entire transaction was acquisition of coal lands in Oklahoma under jurisdiction of the Interior Dept. This transaction completes disposal of government steel properties at Houston. Sheffield had previously signed a 20-year lease for the government's Bloomington mill at Houston and had bought other openhearth facilities from the government in 1946. About \$7,331,000 was involved in this latest deal, of which \$181,000 represents purchase of coal deposits in Oklahoma. Original cost of the furnace and oven was about \$18 million.

• **STEEL CAPACITY WAY UP**—Steelmaking capacity for the steel industry is set at 96 million tons as of Jan. 1, 1949, according to Walter S. Tower, president of the American Iron and Steel Institute. Capacity was boosted 1.8 million tons during 1948 to reach the largest level in the history of the country. Further large-scale expansion is scheduled for the next two years. By 1950, American mills are planning to add 2.2 million more tons of steelmaking facilities, to bring their total capacity to almost 99 million tons.

• **PRICE WAR**—Warehouses in the Los Angeles area are starting to fight for business. New salesmen are being added by several independent outlets. J. T. Ryerson started a major battle recently when they extended their free delivery area to 30 miles. Formerly all warehouses were restricting free deliveries to 5 miles. Some sort of a compromise is expected.

• **CUTS STAINLESS EXTRAS**—Allegheny Ludlum has reduced some stainless steel quality extras by amounts ranging from 5 $\frac{3}{4}$ ¢ to 1 $\frac{3}{4}$ ¢ a lb depending on the size of the individual order, according to Russell M. Allen, vice-president in charge of sales. Stainless steel sheet gages 23 to 26 inclusive were reduced 2¢ a lb while gages 21 and 22 were lowered 1¢ per lb. A slight cut was made in packaging extras for stainless steel strip.

• **BOOSTS AUTO OUTPUT**—Willys-Overland Motors, Inc. is planning to boost jeep and station wagon production during 1949. James D. Mooney, president of the company says, "For the immediate future we plan to step up their production by 50 pct even though it means a temporary division of our available steel supply from the other vehicle lines."

• **HEALTHY CUT**—Chamberlain Corp. in Iowa who makes washing machine wringers has been forced to curtail operations. During one week in December they received cancellations or suspensions from all but one account. Their backlog shrunk from 150,000 wringers to 15,000 in that week.

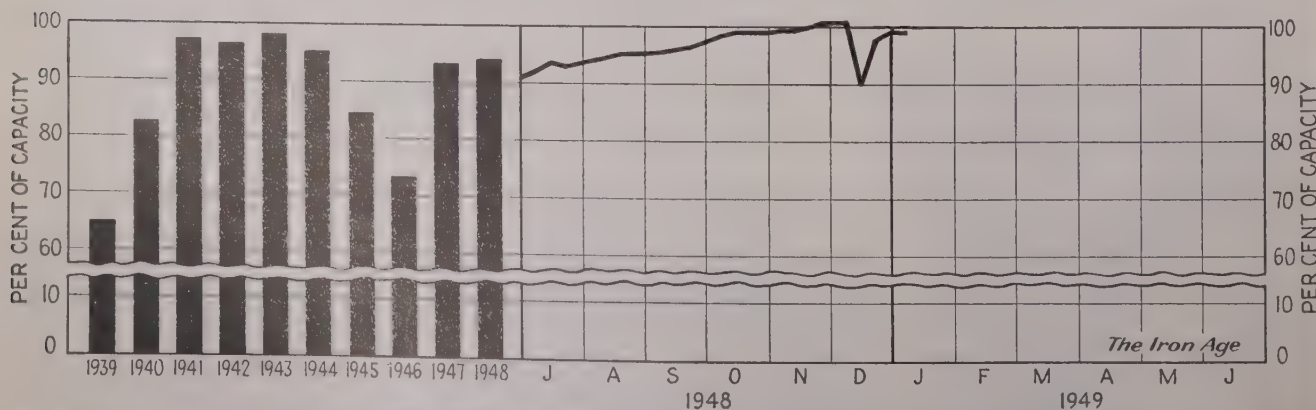
• **PRICE INCREASES**—The Atlantic Steel Co., Atlanta, Ga., has advanced the price of hot rolled bars 30¢ to \$4.40 per 100 lb; bar shapes 25¢ to \$4.50 per 100 lb; strip from \$3.45 to \$3.65 per 100 lb. The increases were effective Dec. 20, 1948.

• **LAYOFF**—Crane Co., in Chicago, large makers of valves and fittings, and plumbing supplies, etc., has reduced operations to four days a week. What were hard to get items three or four months ago are now available out of stock.

• **COLD WAR SCARE**—Washington sources are reported to be quite perturbed over reports that imports of strategic manganese ores from Russia are tapering off and that Russia is playing the cold war to the hilt despite the fact she is badly in need of dollars. Right now, imports continue to come in at normal levels—about 33 pct of our total manganese ore imports. Right now, also, there is no official indication that Russia intends to cease shipping these ores to the United States.

• **FREIGHT CARS UP**—Domestic freight car deliveries for December totaled 9967, third largest month of the year. Deliveries for the year were 112,634 as compared with 68,552 for 1947. This is the highest number of cars delivered in 24 years. On the other hand, orders for the year totaled only 97,184, as compared with 121,308 a year earlier and backlog of orders as of Jan. 1 ran 103,896 as compared with 119,786 a year earlier and 134,676, the 1948 high on May 1.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
January 4.....	100.0*	99.0*	94.0	98.0	98.5*	105.0	95.0	102.0	102.0	99.0	110.0	84.5*	97.5	98.0*
January 11.....	100.5	99.5	94.0	99.0	98.0	105.0	98.0	102.0	102.0	102.0	107.0	80.0	97.5	99.5

* Revised.

- **Scrap Prices Decline About \$2 a Ton**
- **Decline May Be Significant for Steel**
- **But Early Relief in Steel Not Seen**

SCRAP prices slid off this week in every major area. But whether it means that further declines are in order; or that the present drop foretells less steel demand is not clear. One thing is certain; scrap markets all over the country are jittery.

The jitters in Chicago, Pittsburgh, Cleveland, Cincinnati, Youngstown and Philadelphia have been translated this week into lower prices for No. 1 heavy melting steel scrap and other grades. The declines ranged from \$2 to \$2.25 a ton.

The drop in steel scrap prices cannot be laughed off. In past years such declines have been significant. But there have been so many changes in market patterns that the dropping of prices now are not always forecasts of what they were in prewar days.

The wide decline in scrap prices has been due to (1) general uncertainty in business outlook (2) increased scrap imports (3) slow buying by steelmakers and (4) unseasonably warm weather in the East and Middle West.

There was this week no sign that a wide open and drastic break in scrap prices was in the making. But there was evidence that gray market and conversion support which has often helped to keep scrap prices high was fraying badly around the edges. This fact alone has made some scrap brokers and dealers attempt to move what they have at prices they think are reasonable.

The decline in the price of scrap at Pittsburgh, Chicago and Philadelphia has dropped THE IRON AGE composite steel scrap price \$2.08 a gross ton to \$40.92 a ton. The last time the composite was near that level was 6 months ago when the average price was \$40.91 a ton, the week of July 6, 1948.

THE pressure gage on steel demand is going down slowly. But it will not reach a comfortable level — for steel people — for many months. There has been a general scampering of customers in the past week to look over their inventories, tone down some gray market purchases and take a second and third look at their conversion deals (which cost plenty of money).

The gray market this week has lost a lot of its steam. It hasn't become too badly deflated but it is definitely working towards that stage. Prices on some gray market material are down anywhere from \$80 to \$110 a ton from what they

were early in 1948. Worse than that (for those having such steel for sale) is the absence of buyers. Some gray market tonnage is finding no takers even at the new lower prices. The latter are still \$100 or so above the present mill price.

Steel ingots of good grade are moving at around \$95 a ton. The price at some points a few weeks ago ranged up to \$115 a ton. It is doubtful if much tonnage will go at that figure as long as the current pessimism about future demand is alive.

But what does all this mean in the face of current steel shortages and the government trial balloon on more steel capacity—at government expense and control? It means that steel is rapidly going back to a normal market. It means that the extra pressure upon steelmakers is due for quite a change. It also means that holes will appear on schedules—but they will be filled by other steel demands.

The present situation does not mean (1) that steel now can be had when wanted (2) that the operating rate will dip soon (3) that demand is drying up for steel (4) that wholesale layoffs are in the making or (5) that the steel business is going to the dogs.

THE big "ifs" that bother all those who try to make more out of the current signs in business than appears on the surface are (1) more defense spending (2) more government spending (3) rearmament for Western Europe (4) the fluidity of consumer demand and (5) probability of a fourth round of wage increases.

A few of these factors could (1) tighten up the pressure for steel (2) discard fears of a recession (3) make the outlook for higher wages and prices more clear-cut and (4) generally halt deflationary thinking.

One thing stands out. Those who just a few months ago were fearful of inflation and its ills are now beginning to be fearful of deflation and its troubles. Publicly everyone wants lower prices and stabilized conditions. But private talks in the past few weeks have been anything but buoyant.

The steel ingot rate this week is up one and a half points to 99.5 pct of the newly announced capacity. Last week's revised rate was 98.0 pct. Current output remains at a level that would produce more than 92 million tons of ingots a year if the rate were maintained that long.

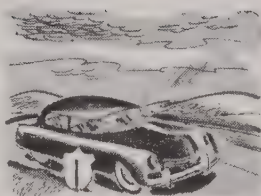
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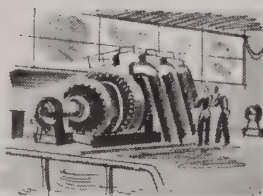
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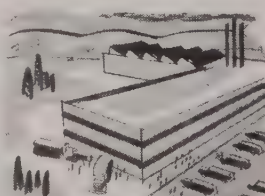
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New Factors Taking Hold To Change Tone Of Steel Scrap Market

Pittsburgh

• • • There is a new deal in the steel scrap market. The honeymoon is over. Filling steel pipelines and signs of easing steel demand are setting the new tone. That is one side of the coin. But the other side is shiny: Right now it appears that 1949 will see more steel melted than ever before in history.

Buying emphasis will be on quality and price. Prices opened the year on a soft slant that is not likely to be reversed soon. But steelmaking scrap prices won't go down much. If they do they'll bounce back. You can't fool the market.

Six factors will influence the market: (1) Buyers are insisting on material meeting specifications; (2) in some cases they will try to lower prices even where the material meets specifications; (3) steelmaking scrap inventories are better than they have been in years (a buyer's market is here); (4) more scrap is coming out; (5) some mills are holding up on return of customer scrap; (6) easing in demand is giving scrap sellers the jitters.

Major market areas have already seen an attempt at the separation of No. 1 from No. 2 steel. During the period of intense demand steel scrap buyers took No. 1 heavy melting steel, No. 1 bundles, No. 2 heavy melting steel and No. 2 bundles indiscriminately, generally paying the same price for all of these grades.

For years No. 1 steel has not generally been furnished on No. 1 steel orders, except on scrap returned to mills by customers. In the past few months the quality of dealer shipments of No. 1 steel has been improving. It still isn't up to standards. No. 1 steel and No. 1 bundles from industry are worth about \$2 above the general run material. But there is a growing tendency to insist that No. 1 steel orders actually be filled with No. 1 steel, according to specifications. On this basis some mills have been rejecting cars. No. 2 material is going to be called No. 2 and paid for accordingly.

Efforts to reduce prices on low

Honeymoon Ends As Inventories Climb and Buyers Shoot At Prices and Quality

By GEORGE F. SULLIVAN
Pittsburgh Regional Editor

phosphorus scrap have already met with some success. Some mills would like to see prices for this grade cut down to the OPA formula, \$2.50 above No. 1 heavy melting steel. As No. 1 shipments approach No. 1 specifications there will be a tendency for low phos to approach this \$2.50 premium point. But the installation of almost 700,000 tons of electric furnace capacity in 1948 and the addi-

tion of about a million tons more in 1949 will keep the pressure on this grade and the full price cut may not be realized. Dropping of some "springboards" is another trend to lower prices, at least for the present.

Generally good scrap inventories are putting buyers in a better bargaining position. Inventories are up for three reasons: (1) Winter came late in some sections of the country; (2) more men are out collecting scrap; and (3) foreign scrap has begun to arrive in fair quantities.

Better scrap supply is in prospect for six reasons: (1) Layoffs in various lines will increase the number of peddlers collecting junk from farms, small shops and urban homes; (2) a substantial improvement in pig iron supply is ahead for the steel industry, which

The Pressure's On!!



means steelmakers can increase the ratio of pig iron to scrap charged to the furnaces; (3) the conversion deal, principal prop under high scrap prices, is on the way down, though it may not be out for some months; (4) better quality means less scrap weight per ton of steel output; (5) auto graveyards will yield more material; and (6) more foreign scrap is due.

At least two mills, Inland Steel and Youngstown Sheet & Tube, have released customers from the obligation of returning scrap. Carnegie-Illinois has not done so and apparently doesn't intend to do so in the near future. Major effect of the Inland and Youngstown action was to weaken the Chicago market.

It will be recalled that, following steel price increases late in July and early in August 1948, the price of openhearth scrap rose by as much as \$2.50 a ton. In some circles it was suggested that some steel companies felt that if finished steel prices rose their customers' returned scrap should be worth more too. Steel company scrap buyers don't see eye to eye on this at all. Some feel present prices for customer scrap are about right, some would slash them \$10 a ton if they could. Scrap prices have practically doubled since the end of OPA, while steel prices have risen about 50 pct. Therefore, said one scrap purchasing agent, the customer is getting a very fair price for his scrap.

Some scrap dealers now have a worse case of jitters than they had in 1932. Brokers are not as worried. They thrive on an active market, make more money when prices are lower because less capital is tied up. What many dealers overlook is that while many mills have tremendous inventories those stocks are not so imposing when stacked against anticipated high operating rates. Steel sales officials see no letup in demand for the first quarter of this year. Many believe 1949 will see more steel produced than ever before in history—in peace or war years. That will take scrap.

Most mills have been out of the market for big tonnages of steel-making scrap. They should be. Many have no more storage space. Others have been embargoed because too many cars of scrap have

piled up on their tracks. More important would be the plight of the steel company vice-president in charge of raw materials who kept on laying down scrap at the former high prices when, by chewing into inventory for a while, he could replace it for less.

How much less? That's the \$64,000 question. This much is true: The bigger buyers know from experience that if prices are pushed too far down supply will dry up. In a year in which the steel industry expects to buy more than 30 million tons of scrap that would be bad.

Action of Scrap Market Is ABC to Scrap People

Chicago

••• Why did the bottom fall out of railroad specialty scrap items? Outsiders are wondering. Scrap people know exactly why—further they expected it. Its ABC. Foundry business fell off sharply last quarter. Pig iron shipment improved tremendously in December. Scrap inventories reached the overhead crane runway at the same time. If the foundry business doesn't pick up scrap will slide even further.

Why should malleable sell for \$84 a ton delivered when pig iron was priced at \$46.50. The only reason was that foundries couldn't get enough iron. Now that they are getting it scrap iron is fast returning to its normal price. It's still too high, judging from past ratios. The market changed so fast malleable hasn't jelled yet. It will, and scrap men believe next sales will take place at around \$50.

Malleable is not the only railroad specialty affected. No. 3 rails have fallen from a \$66 high Dec. 2 to \$54 Jan. 13. This market has been cockeyed for weeks. Buyers were paying high prices as they felt the foundries would continue to buy short rail, 2 ft and under, at any price. Actually the foundries stopped this practice 60 days ago. Buyers of scrap rail continued to pay premiums as they thought they could sort enough usable or rerollers to still make a profit. When rerolling mills pulled out of the market, rail prices fell flat.

Prices on rerollers were \$71 to \$73 last November. Right now they are \$60 or less. Right down

the list the drop in price broke records.

During most of last year cast iron car wheels were like plutonium. The railroads seldom offered them for sale. Rather they earmarked these precious disks back to the wheel foundries in return for new wheels.

About mid-December all foundries threw in the sponge. Their scrap inventories were excessively high. Pig iron was coming in much faster. New business was still falling off. Immediately railroads and brokers started offering the erstwhile precious wheels at lower prices. Wheel prices went from \$66 in early December to \$56 in mid-January. Some brokers are considering throwing in two pairs of pants with each ton purchased.

One fact is certain. The chaotic, gold plated, deal beridden specialty scrap market is history. Nobody is shedding tears here. Buyers are happy. It's their market and they say "it's about time."

Brokers and dealers are happy. Commissions on the old high prices were measly compared to the dollars they were forced to tie up in each and every shipment. Even the railroads are pleased. They believe the break in scrap prices heralds easier steel and iron supplies and eventually lower prices on what they buy.

This may take a little time but at least we have witnessed a sharp break in the inflationary scrap price spiral which may portend many things.

Buys Silicon Company

St. Louis

••• Monsanto Chemical Co. announced recently that its English subsidiary, Monsanto Chemicals Ltd., has purchased control of Silicon (Organic) Developments Ltd., Bridgend, Glamorgan, England.

The newly acquired company is a small organization specializing in the manufacture of silicon chemicals, particularly in the field of developing silicate esters. One of its products, Silester, is important in the precision casting of turbine blades for jet propulsion power units. The product is also used as a waterproofing compound for cement, brick, and stone walls.

USWA Report Shows Gain In Members and Money

Pittsburgh

• • • **United Steelworkers of America** made slight gains both in membership and financial worth during the first 6 months of 1948, according to the union's 12th semi-annual audit.

On June 30, 1948 the union had a net worth of \$6,859,289, an increase of \$35,904. Membership was listed at 930,000, which was about 1500 more than had been previously reported.

During the first 6 months of last year this CIO union collected \$8,318,458 from assessments, initiation fees, dues and miscellaneous sources. Of that amount, \$4,098,573 was refunded to local unions. Expenditures for operation of the international and district offices amounted to \$4,183,981.

On June 30 the union had total assets of \$7,156,089, and current obligations of \$296,799.

Workers Called Back

Syracuse, N. Y.

• • • **Employees of the Easy Washing Machine Corp.** are being called back to work after an inventory and retooling period, according to H. Paul Nelligan, president. The employees were sent home Dec. 13. Nearly all of them are expected to be back on the job by mid-January.

Joins AEC Committee

Washington

• • • **Walter O. Snelling**, consulting chemist and director of research of the Trojan Powder Co., Allentown, Pa., has been appointed to the Atomic Energy Commission's Advisory Committee on Raw Materials, according to John K. Gustafson, manager of the AEC's Raw Materials Operations Office.

Hotpoint Has New Washer

Chicago

• • • **Hotpoint, Inc.**, has begun production on a new washer designed for automatic performance at the setting of a dial but leaving selection of the quantity and temperature of heater to the judgment of the operator, according to Leonard C. Truesdell, vice-president of marketing. The new

washer is priced in the middle bracket, he said.

The washer is being manufactured in a retooled factory that formerly was used to produce electric ranges. Introduction of the washer follows 8 years of engineering research conducted simultaneously with development of the company's push-button electric range and automatic dishwasher.

Named Battelle Trustee

Columbus, Ohio

• • • **Dr. Frank B. Jewett**, formerly chairman of the board, Bell Telephone Laboratories, and formerly president of the National Academy of Sciences, has accepted an appointment as a member of the board of trustees of Battelle Institute, Columbus, Ohio. Dr. Jewett will fill a vacancy created by the death of Dr. Rolland C. Allen, Cleveland industrialist.

Gain Research Posts

Kansas City, Mo.

• • • **Officers of the Midwest Research Institute** have announced the appointments of Dr. George E. Ziegler as director and Dr. Clayton O. Dohrenwend as assistant director of the institute. The announcement followed action taken at the annual trustees' meeting held here recently.

Employment Cutbacks Are Temporary, Bank Reports

St. Louis

• • • **Many of the publicized employment cutbacks** are of a temporary nature and were made because of material shortages or for inventory purposes or similar reasons, the Federal Reserve Bank of St. Louis reported in its Survey of Current Conditions.

In general, the essential differences between economic conditions now and those at the end of 1947 reflect that a considerable part of the urgent needs of consumers and of industry have been met, the bank pointed out.

In meeting those requirements the economy has moved to record levels, but in recent months many of the gains have been at a declining rate, the survey stated. "As urgent demands have been filled, necessary adjustments have occurred. So far these adjustments have not intermeshed to result in a general decline."

The nature of the remaining demand, together with the high employment and income levels that prevail, suggests that these adjustments will continue "without leading to an over-all weakening in the economic structure," the bank said.

FORGING SPINDLES: The heater and hammer man at the Pittsburgh Forgings Co., Corapolis, Pa. are shown here turning out automotive spindle forgings. The heater, through years of experience, is able to determine when the blanks are uniformly at forging temperature by their color.



Industrial Briefs . . .

• **HEATING CONSULTANT**—J. Wesley Cable, formerly director of research and sales of the Induction Heating Corp., has opened offices at 325 E. 41st St., New York, as a consultant to the high frequency heating field. He will offer complete engineering and design service to industry.

• **ADDS DIVISION**—A new division of National Lead Co., New York, to be known as the St. Louis Smelting & Refining Div. will take over the operations of both the St. Louis Smelting & Refining Co. and the St. Louis Smelting & Refining Works.

• **NEW COMPANY**—A. K. Lucas has organized a corporation to be known as the Hocking Valley Foundry, Inc. at Logan, Ohio, for the manufacture of gray iron and semisteel castings.

• **REPRESENTATIVE** — Benjamin F. Brown, Jr., 18 W. Cheltenham Ave., Philadelphia, has been appointed exclusive sales representative in Pennsylvania and southern New Jersey for the Tredegar Co., Richmond, Va., producers of gray iron castings.

• **OPENS SALES OFFICE**—Caine Steel Co., Chicago, has announced the opening of a sales office in the Empire Bldg., 710 N. Plankinton Ave., Milwaukee, to serve the entire Wisconsin area and has appointed William Scott Harms as district representative.

• **PACIFIC COAST DIV.**—Revere Copper & Brass Inc. of New York, has announced the formation of a Pacific Coast Div. with its headquarters in the new mill at 6500 E. Slauson Ave., Los Angeles. Copper and copper alloy tube and brass rod will be the principal products fabricated.

• **BUILDS PLANT ABROAD**—The tenth affiliated plant abroad, Sociedad Anonima Industrial y Commercial Aceros Rheem, of

Rheem Mfg. Co. is nearing completion at Buenos Aires and is scheduled to be in the production of steel shipping containers by March 1949.

• **MERGER**—The merger of two power equipment manufacturers, Combustion Engineering Co., Inc., and the Superheater Co., New York, under the new name of Combustion Engineering-Superheater, Inc., has been announced. Frederic A. Schaff is chairman of the board and vice-chairman of the executive committee, Samuel G. Allen is chairman of the executive committee and Joseph V. Santry is president.

• **CHANGE OF ADDRESS**—The general offices and Montreal branch of Acme Steel Co. of Canada, Ltd. have been moved to new quarters at 660 St. Catherine St. W.

• **PENNSALT SUBSIDIARY**—The Pennsalt International Corp., Philadelphia, has been organized to take over the varied foreign interests of the parent company, Pennsylvania Salt Mfg. Co. It will import and export chemicals and raw materials. Richard L. Davies is president and John H. S. Barr is vice-president.

• **ELECTS OFFICERS**—C. H. Williams, chief engineer, Carnegie-Illinois Steel Corp., Pittsburgh, has been elected president of the Assn. of Iron & Steel Engineers for 1949. John L. Young, vice-president in charge of engineering at National Tube Co., Pittsburgh, was elected secretary.

• **CONSOLIDATION**—The Ford Instrument Co., Inc., Long Island City, N. Y., was merged recently into its parent company, the Sperry Corp., and will be known as the Ford Instrument Co. Div. No change in operations or its personnel is contemplated.

Receives 25-Year Award

Philadelphia

• • • John W. Harsch, chief engineer of Leeds & Northrup Co., Germantown, has been in the employ of the company which manufactures electrical measuring instruments, automatic controls and heat treating furnaces for 25 years. Recently he was tendered a testimonial dinner.



John W. Harsch

In official recognition of the anniversary, Charles S. Redding, president of the firm, presented Mr. Harsch with a 25-year insert for the plaque awarded him on his 15th anniversary.

Mr. Harsch is a member of the Franklin Institute, American Society for Testing Materials and the Philadelphia Chapter of the American Society for Metals of which he was the 1940 president. He holds numerous patents and has been a frequent contributor to technical magazines and journals.

Jack & Heintz Sells Plant

Cleveland

• • • Jack & Heintz Precision Industries, Inc., entered into a contract with White Sewing Machine Corp., Cleveland, for the sale of its Berea Road plant, Dec. 23, for an undisclosed amount.

The plant, comprising approximately 250,000 sq ft of floor space, was acquired by the predecessor company, Jack & Heintz, Inc., in April, 1945, and substantially renovated.

Since White Sewing Machine Corp. will not take possession for some time, production by Jack & Heintz will continue at this location for the present.

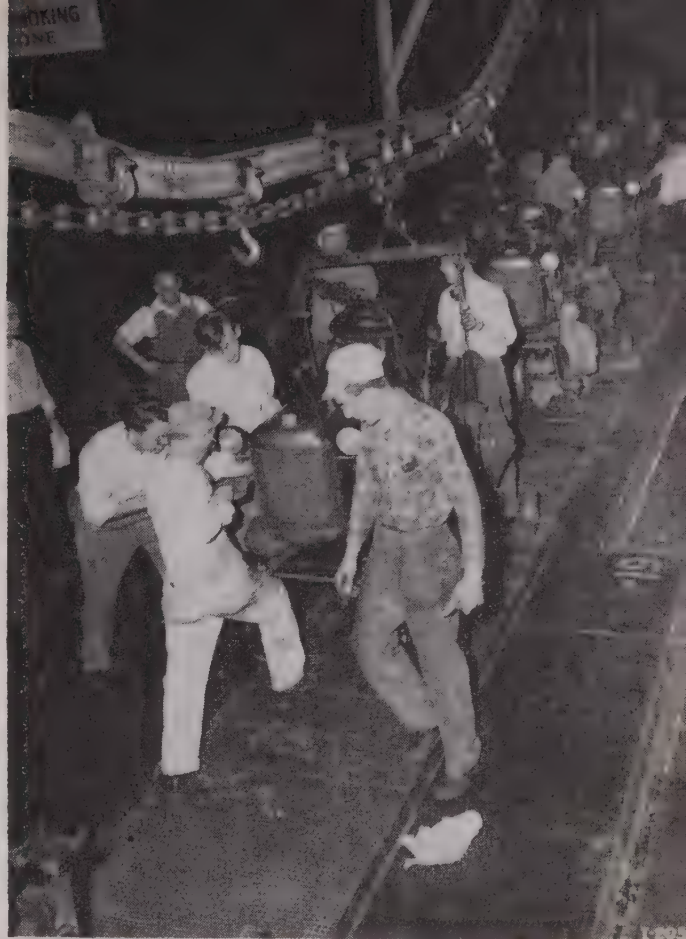
At the time this plant was placed on the market, Jack & Heintz stated the disposition of this property was dictated by the desire to centralize activities at its Maple Heights and Bedford plant locations.

Farm Implement Makers Expect Good Year, Fear Rising Costs

Market for Some Implements Near Saturation; Others Show Strong Demand

By D. I. BROWN
Chicago Regional Editor

IN DOUBT: Typical of 1948 frenzied production is this line at Harvester's Louisville, Ky. plant. How busy it will be by mid-1949 is subject to question.



Chicago

••• Production of farm implements in 1948 broke all records. It would appear to the casual observer that the industry is intent on having two tractors in every barn. Roughly there are 6 million farms, 4 million of which, implement executives told THE IRON AGE, are potential tractor farms. Today there are about 3,394,000 tractors in use, thus this particular market is already near saturation.

Implement makers believe 1949 will be a good year. They say they have caught up with demand for light tractors, cream separators, milking machines, power loaders, some types of cultivators, etc. They claim they still have a long way to go to satisfy demand for large combines, corn pickers, cotton pickers, grain drills, heavy and medium tractors, disc harrows, hay balers, manure spreaders and similar equipment.

Price is the single biggest deterrent to continued good business, large manufacturers told THE IRON AGE. Farmers generally have stopped buying every piece of equipment they can get at any price at any time. Their buying habits have returned to the pre-war seasonal pattern. If they need planting equipment they now wait until the planting season to buy. Previous to mid-1948 they bought all types of equipment any time they could get it.

The gray market in implements

has softened considerably compared to a year ago. Big premiums are still being paid, but only on a few types of machinery. Combines and tractor powered corn pickers are still worth about \$1000 over factory prices. Other scattered types of machinery are still worth premiums in certain localities, but generally the gray market is fast drying up.

Dealers inventories are far below normal on practically all items. By second quarter manufacturers expect this picture to be changed in all items that are now caught up, and possibly some items which have been mentioned as still in short supply.

Export business is very poor excepting direct ECA programs. The lack of dollars has cut large holes in the usual export volume of tractors, combines and tillage tools. If domestic business starts to lag, manufacturers report that production volume could drop very fast as export shipments will not take up any appreciable slack.

Implement makers are preparing to combat the biggest present day bugaboo — price. Another round for labor, higher freight rates, higher steel prices, etc.,

they believe will undoubtedly necessitate higher implement prices. Any large increase in implement prices they believe can very easily price this machinery right out of a market.

Tractors are an extreme example. The age of two-thirds of all tractors now in use is but four years or less. Farmers are not as much modernized in other equipment, but much of their machinery is relatively new. Agricultural buyers are famous for their stringent appraisal of price. When grain prices fell last year, farm implement demand dropped sharply. Another increase in farm machinery prices will drive more buyers to cover.

In order to get ready for such possibilities, implement makers are driving for lower costs. High-priced steel, gray market or conversion, is being dropped whenever possible. Overtime pay in the plants is a thing of the past, except in rare cases. All overhead and operating expenses are being trimmed. Manufacturers feel that only by holding the lowest possible price can they assure themselves of a ready market for their product during the rest of the year.

Britain's 4-Year Aims Indicate That Nation Has a Struggle Ahead

London

••• Four more years of struggle lie before the British people. What this involves is described in a program for 1949 to 1953 which has been submitted to the European Economic Cooperation Commission in Paris.

The document will inevitably be described as Britain's 4-year plan, but it is hardly a plan for some of the estimates can be little more than intelligent guesses. However, it does give a picture of what Britain can expect by 1953 and it is a picture of a country still struggling.

The document visualizes a capital investment program totaling \$8 billion a year.

Hopes To Modernize Mill

Vienna

••• The Danawitz plant of the Alpine-Montan Gesellschaft, Austria's biggest steel producer, is contemplating modernization of its blooming mill facilities. Tentative orders for a new mill, which are subject to ECA approval, have been placed with three American firms, General Electric Co., Morgan Engineering Co. and Hydropsych, Inc.

The new plant would have a monthly bloom and slab capacity of 40,000 metric tons as compared with the 30,000 ton capacity of the present steam-driven mill which is scheduled to be replaced.

Near Saturation Point

Bern

••• Two European markets are near the saturation point. Belgian and Swiss markets show strong evidence that the peak level of business activity for many consumption goods has already been reached.

Economic surveys made by the National Banks of Belgium and Switzerland point out that it is only a return to normal conditions and that there is no need for economic depression fears.

But factors such as unemployment increases, sharp decreases

in the rate of new orders, recession of imports due to international payment difficulties and frantic searches for new export markets are causing some uneasiness in business circles.

Optimistic About New Mill

Buenos Aires

••• President Peron hopes that Argentina's new iron and steel plant at San Nicolas is operating within the next 2 years. Current import requirements run about 600,000 metric tons of finished steel products. This is likely to continue for some years. But he feels the new plant will reduce materially dependence on other countries for steel.

Electrical equipment is already arriving and beginning to be installed for the new works. Other progress is slower than was originally anticipated, mainly because expectations were too optimistic. When the plant is completed, output is expected to run about 500,000 tons of steel and 250,000 tons of finished products annually. This would not materially alter Argentina's ability to supply her own steel needs and appears also to be optimistic in view of her known shortages of iron ore, scrap and coal.

Proposes Sharing Profits

Paris

••• General Charles DeGaulle has proposed a general profits sharing plan for French industry in which labor, capital and management would be closely associated.

"This association," says DeGaulle, "would take place within the framework of industry itself." A social contract agreed upon on equal terms by the various elements would bind them one to another. It would provide a basic wage for the workers, a basic interest for capital and basic rights for management.

Domestic Prices Are Low

Pretoria

••• Standard base prices of finished rolled steel products made by the South African Iron & Steel Corp. are still only 16 pct above prewar prices, it was disclosed at an annual meeting of the company's stockholders.

Delivered prices of British and American steel products in the country's principal market area, the Witwatersrand and nearby, are higher than Iscor's prices by an average of about \$60 a ton or 80 pct, it is claimed. There is a smaller difference, however, when the comparison is made with coastal delivery.

Total finished steel production for 1948 ran about 638,000 net tons. Little increase can be expected before 1950 when Iscor's expansion program is completed. At that time the country's finished steel production should run near 900,000 net tons annually.

Approves Railway Plan

Rio de Janeiro

••• The Chamber of Deputies has approved a plan to establish a fund for modernizing Brazil's railway system. Revenue for this project would come from various sources among which are national and international loans in addition to special taxes.

The program provides for large purchases of rolling stock and extensive replacement of tracks. Docks at many ports are also being enlarged while considerable attention is being devoted to road building.

This program is especially significant since Brazil has tremendous resources of raw materials which other countries are interested in and yet do not take full advantage of because of the poor facilities the country has for large-scale shipments.

Unemployment Increases

Brussels

••• At the end of November, unemployment in Belgium had increased to 170,000 as compared with 130,000 for the previous month. Of this number, 103,000 were totally unemployed and 67,000 were partially idle.

Manufacturing industries are fearing a serious decline in business due to current international payment difficulties. The increase in unemployment is attributed chiefly to Belgian workers who went to France to work and then struck because the French government no longer has sufficient Belgian francs available to assure transfer of their savings.

Some White House Proposals Facing Stiff Fight in Congress—Especially Steel

By GEORGE BAKER
Washington Bureau

• • •

Washington

• • • Legislation designed to implement recommendations made by President Truman in the State of the Union message is scheduled for presentation to Congress this week. But indications on Capitol Hill are that some of the White House proposals—notably that dealing with the Federal Government's entrance into the steel industry—face a tough fight.

In addition to legislation covering the highly-controversial steel capacity recommendation, new bills in the Senate and in the House this week also deal with Truman's proposed controls over allocations of steel and other scarce commodities and over priorities, prices, wage adjustments, and exports.

President Truman, in his State of the Union message, asked for specific legislation for the following purposes:

(1) To continue the power to control consumer credit and enlarge the power to control bank credit.

(2) To grant authority to regulate speculation on the commodity exchanges.

(3) To continue export control authority and to provide adequate machinery for its enforcement.

(4) To continue the priorities and allocation authority in the field of transportation.

(5) To authorize priorities and allocations for key materials in short supply.

(6) To extend and strengthen rent control.

(7) To provide standby authority to impose price ceilings for scarce commodities which basically affect essential industrial production or the cost of living, and to limit unjustified wage adjustments which would force a break in an established price ceiling.

(8) To authorize an immediate study of the adequacy of production facilities for materials

in critically short supply, such as steel; and, if found necessary, to authorize government loans for the expansion of production facilities to relieve such shortages, and furthermore to authorize the construction of such facilities directly if action by private industry fails to meet our needs.

At the conclusion of these recommendations, Truman stated that his Economic Report—which he submitted to Congress two days later—would “discuss in detail the economic background for these recommendations.” It is significant to note that the Council of Economic Advisers, then supported the first seven recommendations with the promised “detailed discussion” but omitted completely to support the eighth recommendation—that dealing with government study and possible construction of steel capacity.

It thus seems clear that President Truman decided to ignore the advice of Dr. Edwin G. Nourse and his Council of Economic Advisers, and to accept, instead, the proposal to begin nationalization of the steel industry “if private industry fails to meet our needs.”

The Economic Report, therefore, consists of two divergent viewpoints, so far as the steel proposal is concerned. The first eight pages consist of a 10-page expansion, submitted to Congress by the President, on the basic 8 points contained in the State of the Union message. The remaining 130 pages consist of the annual economic review submitted to Truman by Nourse and his council. Truman, while he does not specifically mention steel, says:

“There are shortages of supply in certain critical areas which are so serious as to impede maximum production in an expanding economy and to limit programs related to national security.

“I recommend immediate legislation to deal with this problem of capacity and supply. It should impose upon the Government the specific responsibility and provide the funds to make careful surveys of future supply needs and productive capacity. It should further re-

quire that these specific studies be correlated with the general requirements of an economy operating at maximum employment, production, and purchasing power.

“To the extent that facts reveal the need, it should provide additional authority to deal more effectively with inadequacy of capacity and supply.”

Presumably, the proposed study to determine whether or not government entrance into steel production is necessary will be conducted jointly by representatives of government, labor, and management. Representative Klein, D., N. Y., already has suggested a joint commission consisting of the above three groups plus a fourth group to be made up of members of Congress. Should such a group then find steel capacity “inadequate,” the Secretary of Commerce then would be called upon to recommend government financing for immediate construction of new steel-making capacity.

As far as the other business and industry controls requested by the President are concerned, his specific recommendations, as stated in the State of the Union message and in the Economic Report, are as follows:

Allocation Powers: “I propose the temporary extension of the law under which voluntary agreements are now permitted. However, there is grave danger that the problems of acute shortage cannot be adequately met by voluntary agreements. I therefore recommend that the use of mandatory allocation powers be authorized so that they may be employed on a selective basis without delay where they prove to be needed.”

Selective Price and Wage Controls: “Legislation to authorize selective price control should encourage voluntary adjustments without the actual imposition of price control . . . With such authority available, however, its actual application might not be required. It should be supplemented with a provision permitting the Government to order the withholding of price advances for a reasonable period while public inquiry into their justification is being made.”

Export Controls: “I recommend that the existing powers of control over exports be extended, and that the machinery for enforcement be strengthened.”

TABLE I

Trends in Total Factory Man-Hours per Unit
By Type of Machine Tool (1939 = 100)

	1939			1940			1941			1942			1943			1944			1945			1946			1947			Percent of Change		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total	1945 to 1946	1946 to 1947	
All Reported Machines	100	100	100	93	87	90	90	90	90	86	84	91	82	100	92	88	115	102	89	89	95	119	106	110	96	122	110	+1	+2	+4
Boring Machines	100	100	100	93	97	95	94	107	100	87	110	97	79	112	93	79	114	94	80	82	118	97	86	127	102	116	104	+5	+8	+5
Horizontal Boring Machines	100	100	100	85	83	84	89	85	87	82	77	80	81	79	81	85	88	87	90	97	101	95	101	95	98	116	104	+2	+15	+9
Drilling Machines	100	100	100	89	68	84	84	63	79	78	65	75	72	72	72	77	92	81	79	90	79	77	77	79	78	77	79	+1	0	+1
Single Spindle Upright Drills	100	100	100	104	81	98	101	83	97	99	87	96	96	97	96	93	116	99	100	138	110	92	103	95	94	106	97	-4	-2	+3
Radial Drills	100	100	100	86	67	81	80	61	75	74	62	71	68	68	68	74	89	77	75	83	77	74	74	75	77	76	77	-1	+1	+3
Lathes	100	100	100	90	92	91	91	93	91	83	98	95	82	106	94	107	140	120	102	129	113	138	117	143	126	111	117	+5	+4	+8
Engine	100	100	100	98	95	96	97	94	95	93	94	93	92	113	100	95	128	108	92	115	101	105	119	104	122	111	104	+3	+3	+3
Turret	100	100	100	82	91	85	79	84	81	81	84	85	77	108	88	95	152	114	98	152	117	105	147	117	106	162	125	+7	+3	+6
Automatic Screw Machines	100	100	100	82	91	85	79	84	81	81	84	85	77	108	88	95	152	114	98	152	117	105	147	117	106	162	125	+1	+2	+7
Milling Machines	100	100	100	109	98	102	93	90	91	87	103	97	82	106	97	78	107	96	95	136	121	131	115	87	142	120	81	-5	-2	+1
Shapers	100	100	100	95	85	91	86	96	90	88	96	90	93	85	90	89	88	89	93	90	89	92	92	92	91	91	81	-1	-2	+4
Grinding Machines	100	100	100	95	85	91	86	96	90	88	96	90	93	85	90	89	88	89	93	90	89	92	92	92	91	91	81	0	-2	+2
Surface Grinders	100	100	100	95	85	91	86	96	90	88	96	90	93	85	90	89	88	89	93	90	89	92	92	92	91	91	81	0	-2	+2
Tool and Cutter Grinders	100	100	100	95	85	91	86	96	90	88	96	90	93	85	90	89	88	89	93	90	89	92	92	92	91	91	81	0	-2	+2
Plain Cylindrical External Grinders	100	100	100	95	85	91	86	96	90	88	96	90	93	85	90	89	88	89	93	90	89	92	92	92	91	91	81	0	-2	+2
Internal Grinders	100	100	100	95	85	91	86	96	90	88	96	90	93	85	90	89	88	89	93	90	89	92	92	92	91	91	81	0	-2	+2

Labor Dept. Sees

Washington

• • • The average number of man-hours required to build 16 major types of machine tools was 10 pct higher in 1947 than in 1939, and 7 pct above 1945, according to the latest report of the Bureau of Labor Statistics, entitled "Trends in Man-Hours Expended per Unit for Selected Machine Tools."

This new report brings through 1947 an earlier report covering the years 1939 to 1945 (THE IRON AGE, June 26, 1947, p. 106). The coverage of the new report is broader, including additional company reports and a larger number of individual items. It includes reports from 45 firms, accounting for more than half the total production.

The index for direct man-hours increased 7 points from 1945 to 1946, and an additional point from 1946 to 1947, although the index was 4 points below 1939. The index for indirect (overhead) labor man-hours, which in 1945 was 115 pct of 1939, increased an additional six points by 1947, as shown in table I.

Practically all of the rise in unit man-hours during the reconversion period 1945 to 1947, says BLS, is "directly traceable to the sharply lower volume of output." The factors listed include: decline in demand, availability of surplus tools, elimination of wartime standardization, superfluous personnel, excessive capacity, the return of strong competitive forces, changes and modifications in design, and increased demands for customer services.

Indirect man-hours rose less sharply during the 1945 to 1947 period than might have been expected with the large decline in production. The Bureau attributes this to elimination of wartime overhead functions and a reversion to prewar practices in assigning job functions.

The Bureau also points out that a few continuing technological developments tended to prevent rises as large as otherwise might have occurred. These include wider application of carbide-

Lower Productivity in Machine Tool Plants

By EUGENE J. HARDY
Washington Editor

tipped tools, the introduction of hand tools, and the purchase of a limited number of automatic, high-production machines.

Trends in unit labor requirements for individual products were diverse in both direction and degree. Between 1945 and 1946, the indexes for boring machines, lathes, and shapers registered little or no change in unit man-hours. These machines were relatively stable in design, and were produced in only slightly smaller quantities during the latter year.

Total factory man-hours expended per unit for drilling machines and milling machines declined significantly, reflecting the effect of increased output in a number of plants, together with absence of any significant change in either design or production methods. In sharp contrast, the manufacture of automatic screw machines and most types of grinders covered by the study consumed considerably more man-hours per machine in 1946 than in 1945. This is undoubtedly due at least in part to the fact that many of these machines are built to specific customer order. Perhaps an even more important cause for higher unit man-hours was that customers for these machine tools became more particular about specifications for operating characteristics and appearance in 1946, thus necessitating more unit labor time to assure customer satisfaction.

From 1946 to 1947, the indexes for all machine tools except shapers and internal grinders indicated average increases in unit man-hour requirements. The drop of 1 pct in shaper man-hours was not particularly significant. However, the 15 pct decrease in total factory man-hours per unit for internal grinders is noteworthy in that it is based on a decrease of 6 pct in direct man-hours and a much greater reduction in overhead labor. This stems from technological improvements in the form of higher speed tools and more automatic equipment.

During 1946 and 1947, several

builders modified their specifications on lathes and grinders, with the result that the indexes for these tools display an upward trend, resulting in part from the added complexity of the new machines and in part from the unfamiliarity with the most efficient methods of producing them.

The indexes of man-hours expended per unit for groups of firms classified according to size of plant, shown in table II, indicate that establishments of all sizes consumed more labor time to produce a machine tool in 1947 than in 1945. However, despite the diminished volume of production in 1946 and 1947, the smaller plants continued to maintain to some extent the increases in efficiency developed during the war as the result of larger-scale production and technological improvements. A breakdown of total factory man-hours into the direct and indirect labor components reveals that plants employing more than 1000 wage earners required only 3 pct more direct man-hours per unit in 1947 than they did in 1939, but indirect man-hours rose 51 pct during the same interval. All other size groups had direct man-hour levels in 1947 lower than

in 1939, but only the plants employing 100 or fewer wage earners held indirect functions down to a point below that of 1939.

The indexes of unit man-hours by size of plant do not provide a basis for evaluating the relative efficiencies of the various plant size groups, since no such determination is available for 1939, the base year, the Bureau declares. They show only the extent to which annual changes occurred in the unit man-hours expended by firms in each category. Furthermore, the indexes represent effects of influences such as product design changes, work method modifications, and other factors which are not necessarily characteristic of size. The trends for plants employing 251 to 1000 wage earners and for those with 100 or fewer wage earners are so significantly different from the trends of companies of other sizes than in some measure plant size appears to have a bearing on changes in unit man-hour requirements. On the basis of this comparison, it may be tentatively assumed that the companies enjoying the most favorable trends are of the optimum size. However, a final conclusion of this type would require further

TABLE II
UNIT MAN-HOUR TRENDS
By Size of Plant
(1939 = 100)

SIZE GROUP ¹	1939	1940	1941	1942	1943	1944	1945	1946	1947
Total Factory Man-Hours									
Companies employing Wage Earners Totalling:									
More than 1000.....	100	98	97	102	102	112	117	119	124
251 to 1000.....	100	88	91	84	84	89	87	91	93
101 to 250.....	100	82	82	83	84	100	101	111	111
100 or fewer.....	100	92	80	77	82	85	87	88	92
Direct Labor Man-Hours									
More than 1000.....	100	97	94	95	91	96	101	102	103
251 to 1000.....	100	82	91	82	80	82	80	83	88
101 to 250.....	100	81	82	82	73	86	86	92	98
100 or fewer.....	100	94	84	82	86	87	89	91	93
Indirect Labor Man-Hours									
More than 1000.....	100	101	103	113	117	132	138	140	151
251 to 1000.....	100	82	89	86	89	101	100	102	103
101 to 250.....	100	83	83	86	109	138	141	166	139
100 or fewer.....	100	91	76	70	78	83	79	78	83

¹ Size is expressed in terms of number of factory employees since this seemed the best available indication of size of operations in the machine tool plants studied.

TABLE III
UNIT MAN-HOUR TRENDS
By Type of Wage Payment Plan
(1939 = 100)

WAGE PAYMENT PLAN	1939	1940	1941	1942	1943	1944	1945	1946	1947
Total Factory Man-Hours									
Incentive.....	100	95	97	98	96	98	100	99	106
Hourly Wage.....	100	101	102	105	96	116	124	140	133
Direct Labor Man-Hours									
Incentive.....	100	98	95	91	85	84	84	84	90
Hourly wage.....	100	112	100	98	91	110	116	133	129
Indirect Labor Man-Hours									
Incentive.....	100	94	100	104	106	111	112	109	116
Hourly wage.....	100	100	107	118	104	129	143	157	143

study beyond the scope of this report.

Indexes for firms classified according to method of wage payment show that establishments that have some type of incentive system in effect experienced much more favorable trends during virtually the entire period of 1939 to 1947 than did those on an hourly wage basis. These data are shown in table III.

The machine tool industry has never established a uniform wage payment plan. Consequently, the hourly wage system and various incentive systems are used throughout the industry. An analysis was made of the unit man-hour trends for two groups of establishments from which specific wage-payment information was obtained. One group, consisting of seven plants varying in size and in type of product, employed the hourly wage system during 1947. The other group, similar in number and diversification, indicated that some type of incentive system was the prevailing wage payment plan in 1947. In so far as possible, the indexes are constructed to isolate the effect of the wage payment plan upon the trend in unit man-hours, so that the association is not clouded by other factors.

Detailed analysis of data for individual companies included in the comparison revealed that there were no biases (in terms of extent of technological change, types of product, plant size, geographic area, or production methods) which would exert a significant effect upon this comparison.

The outstanding feature of the

trends, as can be seen in table III, is the generally lower level of the unit labor requirement indexes for establishments reporting the incentive system. Since those indexes portray only annual changes in man-hours, it is not to be inferred that the average man-hours expended per machine tool in any particular year were lower for plants employing an incentive system than those of other establishments. However, the indexes indicate that firms using the incentive system maintained a stability which is in contrast to the sharp

fluctuations of the indexes for firms paying hourly wages. The relative similarity of trends for both groups from 1939 to 1943 probably results from the wartime pressure for maximum output. For the machine tool builders, this pressure was relaxed in 1944, and from this point through 1946 the trends diverge sharply. The trend was reversed from 1946 to 1947 and part of the divergence was eliminated. However, with the total factory man-hour index for 1947 reaching a level of 106 for plants on the incentive system and 133 for plants on the hourly wage system.

The analysis of the ratio of indirect labor to total factory labor in the reporting establishments revealed a wide range, which is caused by a number of reasons, including differences in manufacturing procedures, scale of operations, in the nature of products manufactured, and in the classification of accounts. In general, more than half of the firms reported indirect-to-total ratios falling between 21 and 50 pct, and over two-thirds fell between 21 and 60 pct. Less than 10 pct of the firms reported a ratio in excess of 60 pct.

See Building Primary Use

Pittsburgh

• • • Building and transportation applications led all others for aluminum in 1948 according to Roy A. Hunt, president, Aluminum Co. of America, who estimated that the company's 1948 shipments would break down as follows: Building products, 18 pct; transportation, 13 pct; cooking utensils, 9 pct; appliances, 9 pct; power transmission, 6 pct; machinery, 4 pct; to fabricators, 25 pct; others, 16 pct.

Will Distribute Tubing

Los Angeles

• • • Perry Kilsby, Inc. of Los Angeles has been appointed distributor for Shelby seamless tubing manufactured by National Tube Co. and marketed by Columbia Steel Co. on the Pacific Coast.

Stock of Shelby tubing will be maintained in Los Angeles and orders accepted there for direct mill shipments. Carbon, alloys and

stainless analyses, hot finished and cold drawn tubing for all applications will be sold.

Buys Precision Casting

New York

• • • Arwood Precision Casting Corp., Brooklyn, has purchased the Precision Casting Div. of Cooper Alloy Foundry Co., Hillside, N. J. No other facilities are involved. The purchase is in line with Arwood plans to expand its precision casting business and facilities. Following sale of its precision casting division Cooper Foundry will devote all its efforts to its foundry business.

Resigns; Starts Business

Portsmouth, Ohio

• • • Harold J. Ruttenberg, vice president and a director of Portsmouth Steel Corp., has resigned to go into business for himself in Pittsburgh. Mr. Ruttenberg will set up a steel brokerage office and assist consumers in conversion.

First Venezuelan Steel Mill Is Scheduled for Operation by Midyear

New York

• • • Venezuela is slated to have its first steel mill in production at Caracas by the end of June, according to Miles Sherover, president of the newly formed Venezuelan Steel Corp.

American and Venezuelan investors have shared equally in financing the new venture which they estimate will cost about \$1 million. Biggest part of the American investment was provided by the General Investment Co., a subsidiary of the General Tire & Rubber Co. which has had a tire factory in Caracas for over 10 years.

Used equipment purchased from the Symington-Gould Corp., Allegheny Ludlum Steel Corp. and General Electric Co. is already moving to Caracas from New York. Included in the shipments is a 6-ton electric furnace, 2 cranes, 5-in. sq ingot molds, a batch type heating furnace, a 12-in. hand bar mill and other auxiliary equipment. All engineering work, starting this month, will be done by the Arthur G. McKee & Co., Cleveland.

Scrap is plentiful in Caracas. For years it has been dumped on piles as garbage and has had little more use. It is estimated that there are about 40,000 tons readily available. This is more than a 2-year supply on the basis of operations contemplated.

Melting will be done only on night shift at first since there is not an abundance of power. Heats will be conventionally tapped into a ladle and poured into the 5-in. ingot molds. These in turn will be stripped by an overhead crane and immediately placed in the heating furnace for soaking out.

When heated to rolling temperature, the ingots will be broken down on a hand rougher and finished up on the 6-stand 12-in. mill. Estimated productive capacity of the mill is set at about 15,000 tons annually with production running at about 50 pct of capacity.

Demand for this product is strong and operating costs will be comparatively low because of the

readily accessible scrap supply, simplicity and continuity of operations and product standardization. Market for the bars at a good price is thus a certainty especially since the price will be based on the current price of imported bars which runs about \$8 per 100 lb.

More Sleepers Expected

New York

• • • Since the war railroads have been concentrating more on acquiring coaches than on sleepers. Outlook for this year is that the trend will be slowed, or even reversed.

Steel is not as big a problem for output of these types as it is for freight cars. One reason is that basic steel is a much smaller part of total cost. Another reason is that sleepers require specialty steels which are relatively easier to obtain.

Wins Time Study Dispute

Providence

• • • Brown and Sharpe Mfg. Co., Providence, has been upheld by arbitration in a time study dispute between the company and Lodges 1088 and 1142, International Assn. of Machinists.

The issue arose over time established for the scraping operation of a grinding machine. The union claimed that the time was inadequate in that the time study and

the effort rating of the individual were not recognized Brown and Sharpe time study practice. Ruling in favor of the company was Prof. James J. Healy, of Harvard who had been designated by the American Arbitration Assn. to arbitrate the dispute.

Trailer Builders to Meet

Washington

• • • John B. Hulse, secretary-manager, Truck-Trailer Manufacturers Assn., has announced from headquarters here that approximately 200 trailer builders, their suppliers and guests will gather Jan. 17 in the Edgewater Gulf Hotel, Edgewater Park, Miss., for a 3-day annual convention, the eighth such meeting conducted by the association.

Shipments Set New Record

Youngstown

• • • Shipments for December and for the 3 months of October, November and December were the highest in the history of Youngstown Sheet & Tube Co., according to an announcement by Frank Purnell, president. Production records were broken during the year in 16 major producing departments. Records also were broken in many of the processing departments, he said.

Community Improvement

Boston

• • • John A. DeChant, director of community relations, American Iron and Steel Institute, will be a speaker at the National Council for Community Improvement regional Conference here, Jan. 13 and 14.

Coming Events

- Jan. 10-14 Society of Automotive Engineers, annual meeting, Detroit.
- Jan. 10-14 Material Handling Institute and American Society of Mechanical Engineers, Materials Handling Show, Philadelphia.
- Jan. 14 Malleable Founders' Society, semiannual meeting, Cleveland.
- Jan. 17-18 Institute of Scrap Iron & Steel, annual convention, Cincinnati.
- Jan. 24-25 Industrial Furnace Manufacturers Assn., mid-winter meeting, Cleveland.
- Jan. 24-28 American Society of Heating & Ventilating Engineers, annual meeting, Chicago.
- Feb. 9-10 Steel Founders Society of America, annual meeting, Chicago.
- Feb. 14-17 American Institute of Mining & Metallurgical Engineers, annual meeting, San Francisco.
- Feb. 28-Mar. 4 American Society for Testing Materials, spring meeting, Chicago.
- Mar. 8-10 Society of Automotive Engineers, passenger car, body and production meeting, Detroit.



A Record Opening Day Registration

The Materials Handling Exposition Helps Reap Benefits From New Techniques

Philadelphia

• • • Management officials from all over the country are converging on Convention Hall. Before the week is over, more than 20,000 are expected to visit the third annual National Materials Handling Exposition here in the Quaker City.

The stage is set. A record opening day registration has taken place. Manufacturers of the best in handling equipment are displaying their latest models. Conferences dealing with the importance and economies of materials handling are being held concurrently. Interest is at a keen pitch.

It is estimated that more than 25 pct of all factory payrolls is devoted to handling and that about 80 pct of all unskilled labor is engaged in no more than picking things up, moving them, and then putting them down again. That costs money.

Labor, materials and replacement costs are high—and fixed.

By STEVE SMOKE

Associate Editor

• • •

Nothing can be done about them immediately. But many companies have made substantial cost savings by using modern handling equipment and techniques. Others contemplate doing the same. That's why there's a record attendance here. They want to find out how they can transfer production losses on some items into profits or reduce costs.

All the equipment on display is impressive. It can more than justify itself for particular purposes. And some of the exhibits are creating unusual interest.

Clark Equipment Co. is demonstrating a fork-lift type truck with a Dynatork drive which eliminates the clutch and permits instantaneous reversal of travel direction.

Power from the truck's engine is transmitted by magnetic induction through an air gap so that

there is no metal to metal contact between the driving and driven members. The only wearing parts are brushes that run on collector rings mounted on a flywheel.

The Gould Storage Battery Co. is also exhibiting a battery driven fork-lift truck. They show graphically the numerous times these trucks start, stop, reverse direction in a normal shift and the heavy load that is placed on the engine. Both of these trucks are designed to minimize breakdowns, maintenance delays and eliminate the need for spare trucks.

The Omnicron Corp. and Yale & Towne have combined to show a remote control electronic system that operates electric hoists and cranes with motor driven trolleys. The control system can be placed at any convenient location along the path of the crane. It finds particular application in places where visibility is poor from an overhead booth or where ground obstacles make it difficult and dangerous for the operator to follow a hand controlled hoist.

The system can also be set to automatically pick up and set down lifts at predetermined locations and time intervals without touch-

ing the control mechanism. Thus a worker can be doing some other job while the crane is in motion.

Several companies are displaying power cranes on tracks or truck wheels with a boom to which 15 different attachments such as magnets, grabs, tongs, hooks, skull crackers, etc., can be connected. These cranes have been steadily growing more popular because of their versatility and mobility. Original cost is also lower when compared with the installation of cranes and runway systems.

Numerous types of pallets are exhibited. A great deal of discussion is in progress here for their standardization. It has been shown



↑ THEY LAID THE GROUNDWORK: Bernard Lester, center, program chairman, discusses final details as the conferences swing underway. Pictured left to right are: J. B. McGinn, American Viscose Co., chairman of the session on case studies in modern materials handling; O. B. Schier, II, Meetings and Divisions Manager, American Society of Mechanical Engineers; Saul Poliak; Mr. Lester; C. F. Kells, Managing Director, The Electric Industrial Truck Assn.; T. Clapp, Clapp & Poliak, Inc.; C. Heyel, Secretary, ASME Materials Handling Conference Planning Committee. Missing from the picture are: Curtis H. Barker, Jr., General Chairman of the Conference; H. E. Blank, T. A. Marshall, Secretary, Executive Committee; and H. B. Maynard, Chairman, Program Committee.

← DYNATORK DRIVE: E. M. Schultheis, vice-president of Clark Equipment Co., shows Canadian Army officers that the Dynatork drive eliminates need for a clutch. Shown left to right are: Maj. V. Mooney, London, Ontario; Sq Ldr E. E. Smith, RCAF; Capt. A. A. Moffit, Montreal; C. D. Stanley, Clark; Mr. Schultheis; Maj. W. R. Peace, Ottawa; and Robert C. Brady, Ingersoll Steel Co., Div. of Borg Warner, Chicago.

↓ ELECTRONIC CONTROL: R. J. McGill, vice-president of the Omnicron Corp. (standing behind Mr. Drake), is shown explaining the electronic control of hoist systems. Pictured left to right are: L. Weeks and H. Rose, Yale & Towne Mfg. Co.; F. G. Drake, Drake Supply Co.; Mr. McGill; C. E. Saxon, Chicago Tram-rail Corp.; E. S. Moorehead, and M. C. Blind, Yale & Towne, and C. E. Dougherty, Omnicron Corp.

where substantial savings have been made by reducing material damages in transit and in speeding up handling, not only between departments but also between companies.

In addition to the conferences and exhibits, motion pictures showing what modern materials handling means right out in the shop are being shown daily from 11 A. M. to 5:20 P. M. in the Materials Handling Theater.

Last year was a big year for the Materials Handling Exposition. This is still a bigger one. Big enough to make it rank among the first five national industrial exhibits in the country.



Construction Steel . . .

• • • Fabricated steel awards this week included the following:

- 7178 Tons, Los Angeles, penstocks and appurtenant structures for Owens River Gorge, Water & Power Purchasing Agent, Spec. 6748, to Southwest Welding & Mfg. Co., Alhambra & Consolidated Western Steel Corp., Los Angeles.
- 3400 Tons, Hastings, Minn., Mississippi River bridge to Allied Structural Steel Co., 1000 tons of this tonnage are high strength; the balance are carbon steel structurals.
- 1800 Tons, Portland, Ore., towers for No. Bonneville-Troutdale line, Bonneville Power Administration Inv. 4406, to Bethlehem-Pacific Coast Steel Corp., San Francisco.
- 1734 Tons, Missouri, transmission line for Union Electric Power Co., Venice, Ill., through Stone & Webster Engineering Corp., Boston, to Lehigh Structural Steel Co., Bethlehem.
- 1606 Tons, Brems Bluffs, Va., power station for Virginia Electric Co., through Stone

& Webster Engineering Corp., Boston, to Bethlehem Fabricators, Inc., Bethlehem.

- 1270 Tons, Wildwood, N. J., Grassy Sound bridge, through Kelyn Construction Co., to Bethlehem Steel Co., Bethlehem.

- 500 Tons, Philadelphia, General Electric Co., through United Engineers & Constructors, Inc., to Bethlehem Fabricators, Inc., Bethlehem.

- 520 Tons, Chelsea, Mass., substructure of approach Mystic River bridge, through Allied Engineering Corp., Boston, to Carnegie-Illinois Steel Corp., Chicago, Ill.

- 404 Tons, Illinois, transmission line for Union Electric Power Co., through Stone & Webster Engineering Corp., to Lehigh Structural Steel Co., Bethlehem.

- 400 Tons, Kingsport, Tenn., warehouse for Kingsport Press, through Charles T. Main, Inc., Boston, to Bristol Steel & Iron Co., Bristol, Va.

- 360 Tons, Lynn, Mass., boiler plant for Lynn General Electric Co., through Ernst Construction Co., Buffalo, to Bethlehem Fabricators, Bethlehem.

- 300 Tons, Embreeville, Pa., state hospital through McCloskey & Co., Philadelphia to Anthracite Bridge Co., Scranton, Pa.

- 240 Tons, Monroe County, Pa., general hospital extension, through Rahe & Sons East Stroudsburg, Pa., to Bethlehem Fabricators, Inc., Bethlehem.

- 220 Tons, Niagara Falls, N. Y., E. I. Du Pont de Nemours Co., to Bethlehem Fabricators, Inc., Bethlehem.

- 140 Tons, Hewlett, N. Y., school, to Granite Iron Works, Inc., New York.

- 140 Tons, Amherst, Mass., power house for the University of Massachusetts, to Haarmann Steel Co., Holyoke, Mass.

- 125 Tons, Berks County, Pa., bridge, Pennsylvania Dept. of Highways, to Bethlehem Steel Co., Bethlehem.

- 110 Tons, York County, Pa., bridge, Pennsylvania Dept. of Highways, to Bethlehem Steel Co., Bethlehem.

• • • Fabricated steel inquiries this week included the following:

- 32,000 Tons, New Castle, Del., Delaware Memorial Bridge, Delaware Dept. of Highways, due Jan. 25.

- 3600 Tons, Minneapolis, Black Dog power house for Northern States Power Co.

- 1000 Tons, Beloit, Wis., high school building.

- 760 Tons, Grand Island, Neb., State Highway bridge.

- 525 Tons, Mill City, Ore., construction of Detroit Dam on North Santiam River, Portland District, Corps of Engineers, Portland, Schedule No. Eng-35-026-49-333 bids to Feb. 24. (Tentative date reported as Feb. 25 in issue of Dec. 23, 1948.)

- 545 Tons, Kingman, Ariz., highway bridge across forebay channel at Davis Dam, Bureau of Reclamation, Denver, Spec. 2506. Bids to Jan. 20.

- 225 Tons, Chicago, plant addition for Chicago Screw Co.

- 146 Tons, Hillsboro, Md., Tuckahoe and Norwich bridges, Empire Construction Co., Baltimore, low bidder.

- 134 Tons, Denver, construction of foundation for Universal testing machine and building alterations, Denver Federal Center, Bureau of Reclamation, Spec. 2516. Bids to Jan. 27.

- 100 Tons, Stowe, Pa., Stanley G. Flagg & Co., Philadelphia, due Jan. 13.

• • • Reinforcing bar awards this week included the following:

- 2300 Tons, Chicago, housing development, Illinois 2-9, located at 27th to 30th Street on State, through S. N. Nielson & Sons to Bethlehem Steel Co., Inc., Bethlehem.

- 475 Tons, Chicago, Beverley Calumet sewer project, Santucci Co. low bidder.

- 324 Tons, Chelsea, Mass., substructure of approach, Mystic River bridge, through Allied Engineering Co., Boston, to Truscon Steel Co., South Boston, Mass.

- 180 Tons, Concord, N. H., 2 concrete slab bridges over Merrimack River, through Peter Salvucci, Waltham, Mass., and Berke-Moore Co., Inc., Boston, to Bethlehem Steel Co., Bethlehem.

- 180 Tons, South Boston, Mass., Dorchester Ave. bridge, through Berke-Moore, Inc., Boston, to Bethlehem Steel Co., Bethlehem and Northern Steel Co., Boston.

- 150 Tons, Kankakee, Ill., high school building to J. L. Simmons Co., Chicago.

- 130 Tons, Hampton Beach, N. H., superstructure, through Berke-Moore, Inc., Boston, to Joseph T. Ryerson & Sons, Cambridge, Mass.

- 100 Tons, South Chicago, Ill., South Chicago hospital, to Ceco Steel Products Co.

• • • Reinforcing bar inquiries this week included the following:

- 2130 Tons, Mill City, Ore., construction of Detroit Dam on North Santiam River, Portland District, Corps of Engineers, Portland, Schedule No. Eng-35-026-49-333 bids to Feb. 24. (Tentative date reported as Feb. 25 in issue of Dec. 23, 1948.)

- 156 Tons, Bowie, Colo., enlargement of Frio Mountain Canal, Bureau of Reclamation, Paonia, Colo., Spec. 2518. Bids to Feb. 2.

50 YEARS AGO

THE IRON AGE, January 13, 1899

• Andrew Carnegie struck the keynote of American commercial expansion in an interview granted THE IRON AGE last week when he said "our export trade has come to stay." One of the editors added that "this phrase expresses the hopes and ambitions of the manufacturing world from Maine to California."

• At a regular monthly meeting of the Foundrymen's Assn. in Philadelphia, the president, P. D. Wanner, had this to say about business. "All the dark clouds have passed away and the American people are at peace with all nations. The balance of trade is in our favor and gold is coming to our shores in large quantities; therefore, it would seem that a prosperous year is before us."

• Smoke abatement is not new, but tremendous progress has been made in the last 50 years. THE IRON AGE described in detail a device for "the prevention of the emission of dense smoke in cities and other places for which great things are claimed."

• Today it's the Park Works of the Crucible Steel Co. of Ameri-

ca. In 1899—"Park Bros. & Co., Pittsburgh, have just completed an additional 36 pot crucible steel furnace, and it is said that they now have a daily capacity of 110 tons of crucible steel which approximates 35,000 tons a year. This probably makes them the largest manufacturers of that grade of steel in the world."

• "The newest industrial combination to originate is in the manufacture of carbons. A company formed for this purpose, it is stated, will be immediately chartered under the laws of New Jersey as the National Carbon Co. with a capital of \$10 million."

• "Already antitrust laws have been passed in several of the states and more may be looked for as the number of combinations increases, thereby lessening the opportunities for competition in manufacturing."

• "The development of electricity as a motive power for engineering works is making considerable progress in Manchester," says *The Engineer*, a British publication.



This is a picture of "PING"

It's a picture that gives automotive engineers clear-cut facts on performance—a picture that suggests how photography with its ability to record, its accuracy and its speed, can play important roles in all modern business and industry.

No, this is not the "doodling" of a man on the telephone. Far from it. It's the photographic record of an oscilloscope trace that shows, and times, detonation in a "knocking" engine. It all happens in a few hundred-thousandths of a second—yet photography gets it clearly and accurately as nothing else can.

Oscillograph recording is but one of countless functional uses of photography in bettering prod-

ucts and improving manufacturing methods. High speed "stills" can freeze fast action at just the crucial moment—and the design or operation of a part can be adjusted to best advantage.

And high speed movies can expand a second of action into several minutes so that fast motion can be slowed down for observation—and products be made more dependable, more durable.

Such uses of photography—and many more—can help you improve your product, your tools, your production methods. For every day, functional photography is proving a valuable and important adjunct in more and more modern enterprises.

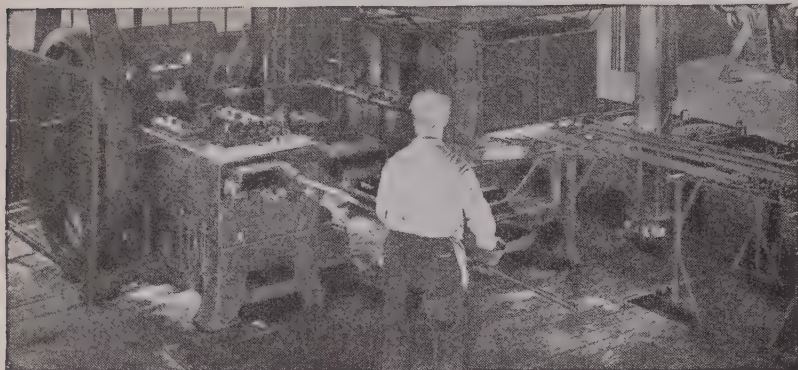
Eastman Kodak Company, Rochester 4, N. Y.

Functional Photography

... is advancing business and industrial technics

Kodak

This is how STROM BALLS are born



A heading machine cutting sections from heated steel rods and compressing them in a die to a rough spherical shape.

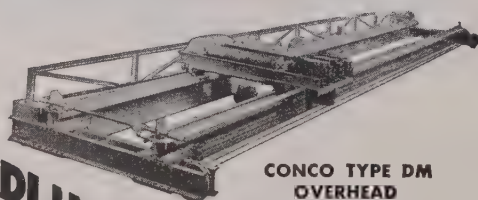
The steel is carefully chosen and inspected, even before it gets to the heading machine. After being "born" here, balls are carefully "brought up," through a long series of grinding and lapping operations, to the unbelievably high standards of finish, sphericity and precision which have made Strom Metal Balls the standard of Industry. Strom Steel Ball Co., 1850 South 54th Avenue, Cicero 50, Illinois.

Strom BALLS Serve Industry

Largest Independent and Exclusive Metal Ball Manufacturer

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HANDLING EQUIPMENT



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OVERHEAD
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● WRITE today for complete information on the CONCO line of hand-powered and electric cranes, hoists and trolleys — a complete line, tried and proven for over twenty years. CONCO engineers are qualified to recommend the right type of handling equipment for faster, more economical production in your shop. Write us now, and take advantage of our long experience in moving more materials, faster and at less cost.

CRANES • HOISTS • TROLLEYS



Division of
H. D. Conkey & Co.

CONCO ENGINEERING WORKS, 15 Grove St., MENDOTA, ILL.

Chevrolet Leading Auto Registrations for 1948

Detroit

• • • The end-of-the-year rush which usually sends automobile registrations skyward in December will not materialize this year. Chevrolet, which has been in steady production during all of 1948, has established a commanding lead over its nearest competitor.

R. L. Polk & Co., Detroit, statisticians for the automotive industry, estimate the year-end will see approximately 3,400,000 new cars registered.

Chevrolet's lead is attributable in part to the fact that Ford production was down for an extended period for a model change during the year, while Chevrolet production has been steadily maintained until the final week of the year.

However, a spurt in registrations during December is expected as Pontiac, Chevrolet and Chrysler prepare to introduce new models early in 1949.

Polk estimates new car registrations for November will approximate 308,000 units compared with 291,442 new cars licensed in October and 296,339 licensed in September. The December total is expected to exceed November as the year-end rush normally sends registrations higher in December.

Polk estimates that the registration of new trucks for the year 1948 will, for the first time in the industry's history, pass the million mark.

Plant for Sale or Lease

Washington

• • • Described as one of the finest manufacturing properties on the West Coast, the Seattle office of War Assets Administration will sell or lease Plancor 156, the Boeing war bomber plant, Renton, Wash.

Bids must be in the Seattle office not later than Jan. 17, 1949. There are 12 buildings with varied equipment on 94 acres of land. The buildings are suitable either for large scale manufacturing or adaptable to subdivision for smaller business.

The sale or lease will be subject to the national security provisions.

New Device Approaches Static DC Transformer

Pittsburgh

• • • A static direct-current transformer, like perpetual motion, has long been a sought-after impossibility. A new device used by Westinghouse engineers called a Transductor comes close. It achieves the same objective for one special purpose. It provides a simpler, safer way of measuring extremely heavy direct currents, Westinghouse engineers claim.

In electrolytic plants, where currents of many thousands of amperes flow in a single bus, the traditional method of metering is to use a shunt (which may be almost as big as an office desk) in the bus and measure its voltage drop. Often this means long leads and placing the full bus voltage to ground on the meter. Both are sources of trouble and an actual hazard.

With the Transductor the massive shunt is replaced by a special current transformer of the through type. The secondary winding is energized by alternating current of some convenient low potential such as 110 v. A change in direct current affects the reluctance of the Transductor magnetic circuit and in turn the current flowing in its ac circuit. This alternating current is measured on a conventional ammeter calibrated in terms of the direct current in the heavy current bus. Curiously a change in ac energizing voltage affects the meter indication only slightly. The scheme, under practical plant conditions, is accurate to 1/2 pct.

Signs Labor Contract

Milwaukee

• • • Allis-Chalmers Mfg. Co. has signed a new contract with Local 248 of the UAW-CIO, covering the West Allis works plant. More than 3600 workers out of 11,000 will receive wage increases totaling \$234,000 this year, it is estimated. This raise is the result of the acceleration of the automatic wage progression based on the length of service with the company.

New contract also provides a no-strike pledge, a grievance procedure, an impartial referee procedure for questions of interpretations and violations of the con-

tract, and a supervised strike vote before any strike after the contract's expiration. The new contract replaces an interim agreement reached between the two parties last July, and it expires June 1, 1949, with a 30-day automatic extension clause.

Melting and Casting Titanium

(Concluded from page 59)

gasses the crucible chamber, but also the charge and the space occupied by it. After evacuating to a pressure of 50 mm Hg, or less, argon is introduced into the furnace during the melting operation to maintain a positive pressure of 1 to 2 psi in the melting chamber. The contamination which occurs during the melting operation is quite minor, and iodide titanium can be melted consistently in furnaces of this type with a very small increase in hardness.

The authors pointed out that

while the arc furnace is particularly suited to the rapid production of small ingots without contamination from the atmosphere or crucible material, it is also adaptable to the production of larger ingots; for example, a 19-lb ingot has been made in a 6-in. diam arc furnace. The titanium melt does not wet or adhere to the water-cooled copper wall. This is the ideal condition which would permit the continuous withdrawal of the ingot from the bottom of the furnace, and it is believed that with relatively little additional work this continuous feature can be developed.

Aluminum Export Quota

Washington

• • • A total export quota of 10,000 tons of aluminum sheet, strip and plate for the first quarter of 1949 has been set by the Dept. of Commerce through its Office of International Trade.

This represents an increase of 1500 tons over the export quota for the fourth quarter of 1948.

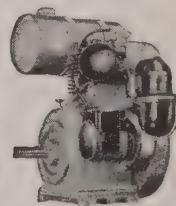
When You Specify...

WISCONSIN *Air-Cooled* ENGINES

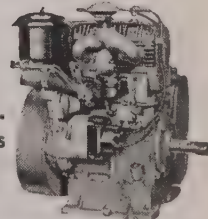
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- Heavy-Duty, long term service . . .
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- Quick, sure-fire starting in any climate, at any season . . .
- Full load power delivery on a continuous service basis if that's what the job calls for . . .
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- Broad-range power adaptability . . .
- Top economy and operating efficiency . . .
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Let us supply you with full details, including engineering data applying to your specific power problems.



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2 to 9 hp.



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7 to 13 hp.



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15 to 30 hp.



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World's Largest Builders of Heavy-Duty Air-Cooled Engines
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FROM North, East, West and South comes NEWS that hundreds of metal processors have found Oakite Composition No. 3 to be ideal for burnishing steel, brass, aluminum (wrought or die cast), zinc die castings and silver.

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Rail Group Acclaims Pre-Shipment Tests Of Enameled Products

Buffalo

• • • Pre-shipment testing of porcelain enamel packaged products, sponsored by the Porcelain Enamel Institute, received the enthusiastic acclaim of more than 200 freight claim and damage prevention officers of U. S. and Canadian railroads at a recent meeting here.

According to A. L. Green, special representative of the Assn. of American Railroads, the pre-shipment testing program, coupled with the employee education plans and improved facilities proposed by the railroads, is expected to greatly reduce claims which have heretofore cost the railroads millions of dollars annually.

Designed to closely simulate actual handling and transportation shocks which the packaged product is likely to encounter, the recommended pre-shipment testing equipment consists principally of: An impact tester which determines the ability of the container, interior packaging, and the product itself to withstand shocks and impacts experienced in actual shipment; and a vertical shock tester which determines the ability of the container, interior packaging, and the product, to withstand vibrational shocks. The conditions simulated include resonance, flat carwheels, rail joints, rough roadbed, and car sidesway.

The testing program has received the official endorsement of the Assn. of American Railroads, the American Trucking Assn., Railway Express Agency, Inc., and of national trade associations representing the manufacturers of major home appliances.

Strikes Show Decline

Washington

• • • Following the normal pattern, the number of strikes has declined toward the year's end. The Bureau of Labor Statistics reports 200 new work stoppages in November as compared with 240 in October.

About 90,000 workers were involved in the strikes as against 110,000 in October—and these fig-

ures included both East and West Coast disturbances among longshoremen. Actually, 375 strikes were in effect during November when October hold-overs are included.

Freight Car Builders Need More Orders and Steel to Meet Goals

New York

• • • Freight car deliveries during 1948 were the highest in 24 years, according to S. M. Felton, president of the American Railway Car Institute. Production in car builders and railroad shops averaged better than 9300 cars monthly, to make a total of about 112,000 cars for the year. This figure represents an increase of nearly 65 pct over last year and is almost three times the 1946 deliveries.

Backlogs as of Dec. 1 totaled only 106,405 as compared with 125,395 a year earlier.

The outlook for deliveries during the early months of 1949 is not bright. Some car companies are running out of orders. Beside that, steel allocations for the first quarter have been reduced sharply. This will undoubtedly lead to a decline in deliveries next spring.

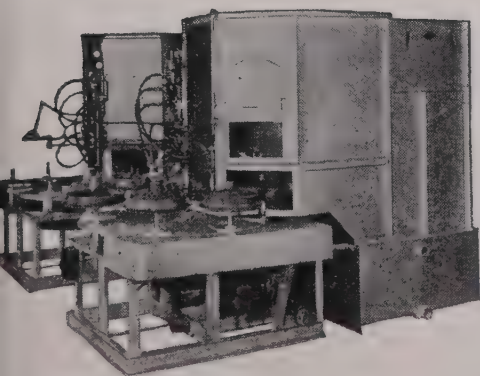
There is little disagreement that thousands of additional freight cars are needed not only to bring the freight car fleet up to its most efficient peacetime operating level but also to be able to meet any possible war emergency.

Various government agencies have estimated the nation's needs at 12,000 to 15,000 cars per month. The Assn. of American Railroads recently went on record for at least 12,000 cars monthly.

Even though the present 10,000-car per month goal has been met only twice in the past 2 years, capacity is available for the higher estimated demands. The primary restricting factors, however, are (1) orders sufficiently far ahead to make planning for large-scale production possible and (2) a steady flow of essential materials. It is therefore evident that more orders are needed immediately and with them the necessary increase in steel.



Putting Air to Work!



Here is a typical example of DeVilbiss engineering skill. This DeVilbiss automatic paints brake drums at the rate of 1,000 per hour. Possibly some phase of your finishing can be done automatically.

Here is a master craftsman—the glass-blower—putting air to work in the practice of his highly skilled profession. Glass-blowers of old were elevated to the nobility and many of their beautiful creations have come down to us through the ages as fitting testimonials to the enduring worth of work well done.

For 61 years DeVilbiss has also made an art of the business of putting air to work. As a result of this long time specialization in increasing production and lowering costs, the name DeVilbiss on a product or complete finishing system is accepted to mean just one thing... *nothing better for the purpose can be found anywhere.*

The unsurpassed speed and efficiency of DeVilbiss systems save valuable man-hours, cut costs, help you produce for less—sell for less. DeVilbiss is today's leading authority on "how to spray it best at lowest cost." When you want such information and the equipment that will do your job best, call DeVilbiss.

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PERSONALS

Personals

(Continued from page 87)

• **William L. Norvell** has been appointed sales manager of the Vericon Television Dept., Remington Rand, Inc., New York. Col. Norvell divides his time between the company's laboratory of advanced research in South Norwalk, Conn., and the offices in New York.

• **Harold E. Churchill** has been named director of research of the engineering division of the Studebaker Corp., South Bend, Ind. Mr. Churchill joined Studebaker in 1926 and was appointed chief research engineer in 1944.

• **Stephen Dudiak** has been elected chairman of the board, Crowell Chemical Co., Carlstadt, N. J. **Maxwell Sawyer** has been appointed president and **Jack O'Hara** vice-president and secretary.

• **Harry B. Miller** has been appointed chief engineer in charge of design and development of Money-Meters, Inc., Providence.

• **James C. Higgins** has been named assistant traffic manager for the Columbia Chemical Div., Pittsburgh Plate Glass Co., Pittsburgh, and for Southern Alkali Corp., succeeding **R. V. Bowman**, who has resigned to enter private business.

• **A. W. Sautter** has become associated with the firm of DuBetta Metals Corp., New York. He had formerly been connected with Aluminum Reserve Corp. and Alloyed Metals Co.

• **E. C. Leeson** has been appointed assistant director of the sales division of Ranger Aircraft Engines division, Fairchild Engine & Airplane Corp., New York.

• **Benjamin Friedman** has been appointed manager of George Birkenstein & Co., Chicago. He formerly served as scrap metal buyer for the metals refining division of the Glidden Co.

• **Robert M. Whitney** has been appointed advertising manager of Automatic Transportation Co., Chicago. Mr. Whitney joined the company in the engineering department in 1936.

• **J. Lester Turney** has been appointed assistant to the general sales manager of International Business Machines Corp., New York. He is succeeded as manager of customer engineering by **M. R. Dilling**, who previously served as assistant manager of customer engineering. Mr. Turney joined IBM in 1923 and Mr. Dilling became associated with the company in 1941.

• **H. W. Clapsaddle** has been named divisional comptroller of Buick-Oldsmobile-Pontiac Assembly division of General Motors Corp., New York, succeeding **J. A. McFetridge**, whose appointment as division comptroller of the Allison division of G.M. in Indianapolis, has been announced. Mr. Clapsaddle, who has been serving as assistant divisional comptroller of the BOP division, joined the corporation in 1928. Mr. McFetridge, who has been divisional controller of BOP since 1945, joined G.M. in 1928.

• **Hal M. Cranston** has been appointed comptroller of Owens-Corning Fiberglas Corp., New York. Mr. Cranston has been with Fiberglas since it was founded in 1938.

• **Stuart S. Wall** has been elected vice-president and general counsel of Libbey-Owens-Ford Glass Co., Toledo. **Curtis W. Davis**, general factories superintendent, has been named vice-president. **Ross S. Carey** has been named Mr. Wall's assistant.

• **E. D. Wingfield**, who has been general manager of Freeport Sulphur Co., New York, has been elected a vice-president in charge of the company's southern operations, with his offices in New Orleans. Mr. Wingfield joined the Freeport organization in 1933 and has held operating, sales and executive positions.

• **Herbert R. Earle, Jr.**, has been named assistant sales manager of the coach division, Reo Motors, Inc., Lansing, Mich.

• **Fred W. Mill** has been named division controller for National Supply Co., Torrance, Calif., succeeding **A. E. Witt**, who has retired.

← From this . . .

to this ↓ in one continuous operation!

Hunter Manufacturing Corporation roll forms sections of window frame . . . uses Kaiser Aluminum for the job because of its consistent high quality and workability.

Mass produced from coiled sheet in **ONE CONTINUOUS OPERATION!**

HOW? Hunter Manufacturing Corporation, Bristol, Pennsylvania, *roll forms* this section of window frame from a Kaiser Aluminum alloy!

It's a typical example of low cost fabrication possible with the uniform high quality and workability of Kaiser Aluminum.

In this operation Kaiser Aluminum coiled sheet is run through a 20-stand roll forming mill. Despite the severe forming done by these 20 rolls in a progressive operation, the completed section is produced in straight lengths, free from cracks and other defects.

As the continuous formed piece emerges —at the rate of 75 feet per minute—a traveling shear cuts it to exact length for final assembly.

What does this mean to you?

In the manufacture of your product, perhaps some parts can be mass produced

by roll forming with the proper alloy of Kaiser Aluminum. If so, chances are you can get these tangible, dollars-and-cents benefits: Lower unit cost—greater uniformity of finished parts—improved surface finish—simplified production scheduling and planning.

And—due to Kaiser Aluminum's *lightness*—you'll get lower handling and shipping costs, reduced worker fatigue, lower labor costs!

But most important, you'll get a better product with Kaiser Aluminum! A product that's strong and durable, that won't rust and that can't be matched for sales appeal.

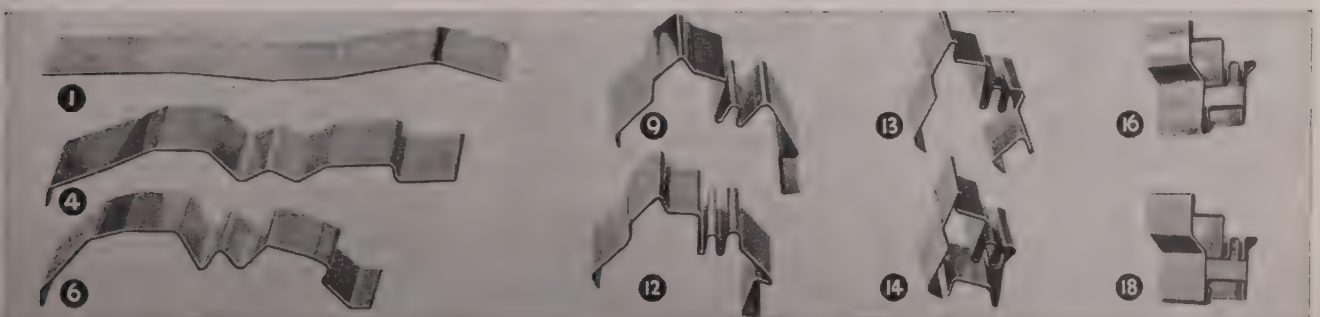
Whether your product is roll formed, spun, drawn, or fabricated by any other method, couldn't *you* lower costs by using the proper alloy of strong, versatile Kaiser Aluminum? Call in a Permanente engineer. He'll help you find the answer!

Permanente Metals

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Kaiser Aluminum

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These cross sections, taken from nine of the 20 stands of a roll forming mill, illustrate progressive stages of fabrication from Kaiser Aluminum

coiled sheet to finished section. In one continuous operation an important part of a window frame is rapidly formed!

Defense Program Looms as Possible Shot in the Arm for Toolmakers

• • • Predictions of the hot-stove league to the contrary, brightest sales prospect for the first quarter for major segments of the machine tool industry is the defense program.

A large volume of inquiries, stemming from defense program sources, has been reported in the East and Middle West and, as one sales manager put it, "if we get 20 pct of our inquiries in orders, we'll be off to a big start."

Government buying in substantial volume will also alleviate a growing price problem which some segments of the industry are feeling, including many companies that have lots of stuff that's likely to break into sales at any time. At least one company that raised prices recently reported an unpleasant reaction to the increase on the part of some customers, which led a sales executive of the company to remark, "We've gone just about as far as we can on this price thing, barring a wild inflation. These high prices are making it harder to prove the machines in, but labor is still the high-cost item, and to make money during the next 12 months, many plants must cut costs and, therefore, buy new machines."

A possible virtue of the present high prices, of course, is the fact that they permit the companies to be renegotiated on a higher level on the government business.

In Cleveland, Tell Berna, general manager, National Machine Tool Builders' Assn., told a group of sales executives that American business men have not kept their equipment and machinery up to date. He said manufacturers of production equipment and machine tool builders have a big job of selling to do, and in addition, they have to compete with foreign machinery manufacturers who pay low wages. "The only way we can compete is to produce more per man hour."

In Detroit, much hopeful attention is being given to quotations

Inquiries Reported Coming From East and Middle West; Makers Eye Effects of Prices

• • •

recently requested by several prominent auto manufacturers. No important commitments have been reported during the past fortnight, but informed suppliers are confident that several of the many programs now being given consideration will materialize.

It now appears that local car manufacturing establishments which had earlier indicated a willingness to see a large part of their parts production in the hands of small establishments may have found it more economical or otherwise advantageous to bring the production of subassembly parts into their own plant. This is not yet a trend—the signs are too indefinite. But there are those who predict that the earlier tendency has been arrested.

Most suppliers in Detroit look for a year close to normal in 1949, but they hardly expect their volume to compare favorably with 1946 or 1947. That it could be a better-than-average year is indicated by the number of jobs on which quotations have already been requested.

A survey of machine tool producers in this area indicates that most firms will show a lower dollar volume than a year ago, with the decline ranging from a few percent to as much as one third. A factor in this situation is, of course, the relative absence of WAA business in 1948, which accounted for a sizable portion of the 1947 volume.

Bright spots in the 1949 picture are the possibility of high compression engine programs by Olds, Buick, Chevrolet and possibly Ford. There is also the strong probability that additional placements for automatic transmissions

will soon materialize. The possibility of early developments in the Borg-Warner transmission is not being overlooked.

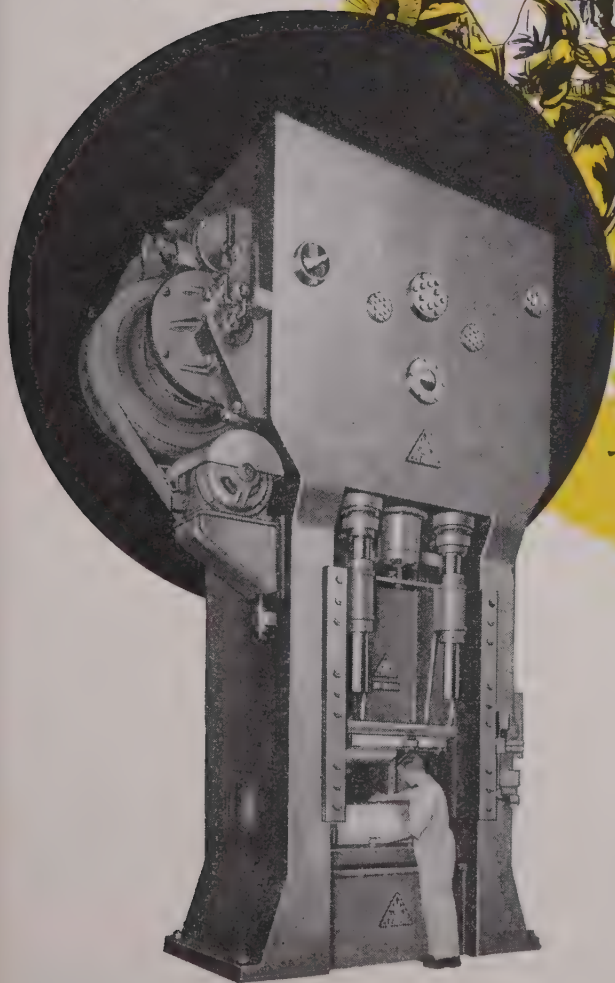
Foreign business has taken a further decline this past year, it was disclosed, and the present prospect is for a continued decline during 1949. Another unpromising aspect of the present situation is the sharp reduction in capital expenditures without which the machine tool industry can hardly hope for a large volume of business.

At the moment, all eyes are on Oldsmobile's new engine plant and the public reception of the new high compression engine. If this engine is received with anticipated public enthusiasm, the present prospects for the machine tool industry in 1949 can change quickly to a much more optimistic outlook, according to several informed industry sources. Another factor to be considered is activity in furthering a revitalized ordnance program.

In Chicago the last week in the year wasn't at all typical of 1948 business in the machine tool industry. No one expected it to be, but a lot of makers are afraid the coming weeks of the first quarter might be similar. If this happens, it is going to be rough. Buyers are shopping like everything, with deliveries so good they can afford to be extra choosy. Some of the shoppers have ready money they intend to spend, but others admit they are merely looking. Some are looking for bargains, etc., but it appears this group is premature. In fact, in the last few weeks, two major makers increased prices 10 pct. One was on a standard line of boring mills, the other was drill-ing machines.

All told, the machine tool industry is hoping 1949 will repeat 1948 volume. They aren't thinking about doing better than 1948—just praying they do as well, in which case the industry will consider it a happy year.

1949 GOLD RUSH



It's '49 again, but the gold rush of the 1800's has become a different kind of struggle. In 1949, enterprising Americans aren't looking for nuggets. They're seeking profit through reduced manufacturing costs.

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Whatever your press problem, Clearing's experience and engineering vision can help you.

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NONFERROUS METALS

... News and Market Activities

Lead Market Easier; Copper and Zinc Shortages More Acute

New York

••• Lead is no longer the non-ferrous metal in primary short supply. Its supply position has eased in recent weeks, but shortages of copper and zinc have been intensified. The lead market has improved largely due to lessened pressure on secondary lead supplies due to the filling up of replacement battery pipelines and the lower demand for cable manufacturers due to the copper strike. Incoming shipments of lead, held up by strikes of longshoremen on the West and East Coasts, have built up supplies of foreign lead and concentrates since the end of the strikes.

Consumers are still taking up all lead tonnages, and if more were available could operate their plants at higher levels. There is no indication of current sales of foreign or secondary lead at above-market prices. Consumers have resigned themselves to the necessity for reduced operations as preferable to gray market purchases. But consumers are expected to step into the market for higher tonnages as soon as the metal becomes available. It is estimated that the tetraethyl industry will consume 100,000 tons in 1949.

The strike of railroad workers at the Bingham Canyon, Utah, mine continues unchanged. The strike is now in its 12th week and involves a loss of 23,000 to 24,000 tons of copper a month. Coupled with strategic stockpiling which continues at the rate of about 10,000 tons a month, the strike has created havoc in the copper market. Premium prices

Expect Shortages to Continue Beyond the First Quarter; Prices Are Unchanged

o o o

are still being paid for January copper. It is certain that the shortage will continue throughout the first quarter even if there should be an early settlement. Demand for copper has eased off in some quarters. Wire mill requirements for appliances are down. But mills are still seeking metal for other wire uses. Brass mill order books are spotty, but they are looking for tonnages of copper shapes, particularly billets for tube production.

The zinc shortage has grown more acute and zinc is now reported in brass mill circles to be as tight as copper. Galvanizing demand is particularly heavy. Die casting demand has eased off some, but there is no surplus metal available. Government stockpiling is being pressed at the rate of about 6000 tons a month. It is estimated that stockpiling plus the consumption of western Europe under the ECA program deprives domestic consumers of some 13,000 to 15,000 tons a month. It appears now that the ECA program will be extended, a factor that is expected to prolong the shortage. The strike at two zinc producing plants of American Zinc, Lead & Smelting Co. is still in effect after nearly six months.

A bill has been introduced into the House by Representative

James Van Zandt to suspend the duty on zinc imports for a period of two years. There is a good probability of the passage of this legislation in view of the current shortage of zinc and the fact that duty has been suspended on both copper and lead. It is pointed out by the trade that European smelters are beginning to build up their production now that more fuel, labor and food is available. Foreign smelters will be competing for available tonnages of ores and concentrates, and the present duty of 0.75¢ per lb of metal content in concentrates and 0.875¢ per lb for slab zinc will handicap our own industry. Imports of foreign zinc and concentrates account for about 40 pct of the needs of the domestic industry.

Ingot makers dropped their buying prices for brass and bronze scrap grades by ½¢ last week. In the declining market, brass and copper scrap is in ample supply, a development that has been fostered by the ending of consumer buying of scrap. Dealers lowered their buying prices for brass and bronze grades by ½¢. One Philadelphia ingot maker also reduced its prices by the same amount. Refiners are holding to their price schedule of 20.50¢ for No. 1 copper and wire, and are getting plenty of scrap.

Smelters have increased the smelting charge for used battery plates to a range of \$50 to \$60 a ton. This action brings down the dealers' buying price for battery plates to 10½¢ per lb. The drying up of premium prices for secondary lead has taken the pressure off the battery lead market and prices have dropped repeatedly in recent weeks.

Foundry buying of ingot aluminum and ingot brass and bronze has been very slow in the last few months. Aluminum smelters understand from their customers that this is due largely to a desire to test the market.

Nonferrous Metals Prices

	Jan. 5	Jan. 6	Jan. 7	Jan. 8	Jan. 10	Jan. 11
Copper, electro, Conn.	23.50	23.50	23.50	23.50	23.50	23.50
Copper, Lake, Conn.	23.625	23.625	23.625	23.625	23.625	23.625
Tin, Straits, New York	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03	\$1.03
Zinc, East St. Louis	17.50	17.50	17.50	17.50	17.50	17.50
Lead, St. Louis	21.30	21.30	21.30	21.30	21.30	21.30

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, 10,000 lb, freight allowed	17.00
Aluminum pig	16.00
Antimony, American, Laredo, Tex.	38.50
Beryllium copper, 3.75-4.25% Be	
dollars per lb contained Be	\$24.50
Beryllium aluminum 5% Be, dollars per lb contained Be	\$52.00
Cadmium, del'd	\$2.00
Cobalt, 97-99% (per lb)	\$1.65 to \$1.72
Copper electro, Conn. Valley	23.50
Copper, lake, Conn. Valley	23.625
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$2.25
Iridium, dollars per troy oz.	\$110 to \$115
Lead, St. Louis	21.30
Lead, New York	21.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex.	20.50
Magnesium, sticks, carlots	34.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	\$90 to \$92
Nickel electro, f.o.b. New York	42.90
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$89 to \$93
Silver, New York, cents per oz.	70.00
Tin, Grade A, New York	\$1.03
Zinc, East St. Louis	17.50
Zinc, New York	18.15
Zirconium copper, 10-12 pct Zr, per lb contained Zr	\$12.00

Remelted Metals

Brass Ingot

(Published prices, cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	20.50*
No. 120	20.00*
No. 123	19.50*
80-10-10 ingot	
No. 305	27.25
No. 315	24.25
88-10-2 ingot	
No. 210	33.00
No. 215	31.00
No. 245	24.25*
Yellow ingot	
No. 405	16.75*
Manganese bronze	17.50
No. 421	23.00
* F.o.b. Philadelphia.	

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 aluminum-silicon alloys	
0.30 copper, max.	30.00-30.50
0.60 copper, max.	29.75-30.25
Piston alloys (No. 122 type)	26.00-26.50
No. 12 aluminum (No. 2 grade)	25.50-26.00
108 alloy	26.00-26.50
195 alloy	26.00-26.50
13 alloy	30.00-30.50
AXS-679	26.00-26.50

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95 pct-95½ pct.	27.50-28.00
Grade 2—92 pct-95 pct.	26.25-26.75
Grade 3—90 pct-92 pct.	25.25-25.75
Grade 4—85 pct-90 pct.	24.50-25.00

Electroplating Supplies

Anodes

(Cents per lb, freight allowed, in 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	40%
Electrodeposited	34%
Rollad, oval, straight, delivered	37.34
Ball anodes	38%
Brass, 80-20	
Cast, oval, 15 in. or longer	35%
Zinc, oval, 99.99	
Ball anodes	
Nickel 99 pct plus	
Cast	59.00
Rollad, depolarized	
Cadmium	\$2.10
Silver 999 fine, rolled, 100 oz. lots, per troy oz, f.o.b. Bridgeport, Conn.	79

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	46.00
Copper sulfate, 99.5 crystals, bbls.	9.10
Nickel salts, single or double, 100 lb bags, frt. allowed	18.50
Nickel chloride, 300 lb bbl.	24.50
Silver cyanide, 100 oz. lots, per oz.	59
Sodium cyanide, 96 pct domestic 100 lb drums	16.00
Zinc sulfate, crystals, 22.6 pct, bags	
Zinc sulfate, 25 pct, granules, bbls. frt. allowed	

Mill Products

Aluminum

(Base prices, cents per pound, base 30,000 lb, f.o.b. shipping point, freight allowed)

Flat Sheet: 0.188 in., 2S, 3S, 26.9¢; 4S, 61S-O, 28.8¢; 52S, 30.9¢; 24S-O, 24S-OAL, 29.8¢; 76S-O, 76S-OAL, 36.3¢; 0.081 in., 2S, 3S, 27.9¢; 4S, 61S-O, 30.2¢; 52S, 32.3¢; 24S-O, 24S-OAL, 30.9¢; 76S-O, 76S-OAL, 38¢; 0.032 in., 2S, 3S, 29.6¢; 4S, 61S-O, 33.5¢; 52S, 36.2¢; 24S-O, 24S-OAL, 37.9¢; 76S-O, 76S-OAL, 47.6¢.

Plate: ¼ in. and heavier: 2S, 3S, F, 23.8¢; 4S-F, 26¢; 52S-F, 27.1¢; 61S-O, 26.6¢; 24S-F, 24S-FAL, 27.1¢; 76S-F, 76S-FAL, 33.9¢.

Extruded Solid Shapes: Shape factors 1 to 4; 35.1¢ to 66¢; 11 to 13, 36.1¢ to 78¢; 23 to 25, 38.2¢ to 1.07¢; 35 to 37, 45.7¢ to 1.65¢; 47 to 49, 67.5¢ to 2.41¢.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 34¢ to 30.5¢; Cold-finished, 0.375 to 3.5 in., 2S, 3S, 36.5¢ to 32¢.

Screw Machine Stock: Drawn, ¼ to 11/32 in., 11S-T3, R317-T4, 49¢ to 38¢; cold-finished, ¼ to 1½ in., 11S-T3, 37.5¢ to 35.5¢; ¾ to 2 in., R317-T4, 37.5¢ to 34.5¢; rolled, 1/16 to 3 in., 11S-T3, 35.5¢ to 32.5¢; 2½ to 3½ in., R317-T4, 33.5¢ to 32.5¢. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in.: 2S, 36¢ to 26.5¢; 52S, 44¢ to 32¢; 56S, 47¢ to 38.5¢; 17S-T4, 50¢ to 34.5¢; 61S-T4, 44.5¢ to 34¢; 76S-T6, 76¢ to 55¢.

Magnesium

(Cents per lb, f.o.b. mill, freight allowed Base quantity 30,000 lb)

Sheet and Plate: Ma, FSA, ¼ in., 54¢-56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 12, 63¢-65¢; 14, 69¢-74¢; 16, 76¢-81¢; 18, 84¢-89¢; 20, 96¢-1.01¢; 22, 1.12¢-1.31¢; 24, 1.62¢-1.75¢. Specification grade higher.

Extruded Round Rod: M, diam. in., ¼ to 0.311, 58¢; ½ to ¾, 46¢; 1½ to 1.749, 43¢; 2½ to 5, 41¢. Other alloys higher.

Extruded Square, Hex. Bar: M, size across flats, in., ¼ to 0.311, 61¢; ½ to 0.749, 48¢; 1½ to 1.749, 44¢; 2½ to 4, 42¢. Other alloys higher.

Extruded Solid Shapes, Rectangles: M, in weight per ft, for perimeters of less than size indicated, 0.10 to 0.11 lb. per ft. per. up to 3.5 in., 55¢; 0.22 to 0.25 lb per ft. per. up to 5.9 in., 61¢; 0.50 to 0.59 lb per ft. per. up to 8.6 in., 47¢; 1.8 to 2.59 lb per ft. per. up to 19.5 in., 44¢; 4 to 6 lb per ft. per. up to 28 in., 43¢. Other alloys higher.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ to 5/16, \$1.14; 5/16 to ¾, \$1.02; ¾ to 1, 76¢; 1 to 2 in., 65¢. 0.065 to 0.082, ¾ to 7/16, 85¢; ¾ to 1, 62¢; 1 to 2 in., 57¢. 0.165 to 0.219, ¾ to 1, 54.5¢; 1 to 2 in., 53¢; 3 to 4 in., 49¢. Other alloys higher.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled	60	47
Strip, cold-rolled	68	50
Rods and shapes		
Hot-rolled	56	45
Cold-drawn	56	45
Angles, hot-rolled	56	45
Plates	58	46
Seamless tubes	89	80
Shot and blocks		40

Copper, Brass, Bronze

(Cents per pound, freight prepaid on 200 lb)

	Extruded Shapes	Rods	Sheets
Copper	36.78		37.18
Copper, hot-rolled		33.03	
Copper, drawn		34.23	
Low brass	38.57*	35.35	35.66
Yellow brass	37.60*	34.28	34.59
Red brass	38.92*	35.70	36.01
Naval brass	34.90	33.65	39.59
Leaded brass		29.24	
Commercial			
bronze	39.54*	36.57	36.88
Manganese bronze	38.49	36.99	43.09
Phosphor bronze,			
5 pct	57.80*	56.30	56.05
Muntz metal	34.47	33.22	37.66
Everdur, Herculoy,			
Olympic, etc.	40.49	40.76	41.82
Nickel silver			
10 pct		47.17	44.77
Architectural			
bronze	33.42		
* Seamless tubing.			

Scrap Metals

Brass Mill Scrap

(Cents per pound; add ½¢ per lb for shipments of 20,000 lb or more)

	Heavy	Turn- ings
Copper	21½	20%
Yellow brass	18½	18%
Red brass	20	19%
Commercial bronze	20½	19%
Manganese bronze	18½	17%
Leaded brass rod ends	18½	

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery.)

No. 1 copper wire	20.50
No. 2 copper wire	19.50
Light copper	18.50
Refinery brass	18.25-18.50

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer.)

No. 1 copper, wire	19.75
No. 2 copper, wire	18.75
Light copper	17.75
No. 1 composition	16.00
No. 1 comp. turnings	15.75
Rollad brass	12.75-13.25
Brass pipe	13.25-13.75
Radiators	14.00
Heavy yellow brass	12.50

Aluminum

Mixed old cast	16.00
Mixed old clips	16.00
Mixed turnings, dry	14.50
Pots and pans	16.50
Low copper	19.00

Dealers' Scrap

(Dealer's buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18½-19
No. 2 heavy copper and wire	17½-18
Light copper	16½-17
Auto radiators (unswaged)	12-12½
No. 1 composition	14-14½
No. 1 composition turnings	13½-14
Clean red car boxes	11½-12
Cocks and faucets	11½-12
Mixed heavy yellow brass	8½-9
Old rolled brass	11-11½
Brass pipe	12½-13
New soft brass clippings	15-15½
Brass rod ends	13-13½
No. 1 brass rod turnings	12½-13

Aluminum

Alum. pistons and struts	8-8½
Aluminum crankcases	12-12½
2S aluminum clippings	16-16½
Old sheet & utensils	12-12½
Borings and turnings	6-6½
Misc. cast aluminum	12-12½
Dural cast (24S)	12-12½

Zinc

New zinc clippings	10½-11
Old zinc	9-9½
Zinc routings	5½-5¾
Old die cast scrap	5¾-6¼

Nickel and Monel

Pure nickel clippings	23-23
Clean nickel turnings	17-18
Nickel anodes	22-23
Nickel rod ends	21-22
New Monel clippings	15½-16½
Clean Monel turnings	11-12
Old sheet Monel	13-14
Old Monel castings	10-11
Inconel clippings	12-13
Nickel silver clippings, mixed	8-8½
Nickel silver turnings, mixed	7-7½

Lead

Soft scrap lead	18-18½
Battery plates (dry)	10½-10½

Magnesium Alloys

Segregated solids	8-9
Castings	4½-5½

Miscellaneous

Block tin	82-84
No. 1 pewter	65-67
No. 1 auto babbitt	51-53
Mixed common babbitt	19-19½
Solder joints	21½-22½
Siphon tops	50-52
Small foundry type	20½-21
Monotype	19½-20
Lino. and stereotype	19-19½
Electrotype	17½-18
New type shell cuttings	15½-16
Hand picked type shells	6½-7
Lino. and stereo dross	10½-11
Electro dross	7-7½

UNIT 1020A

HEAVY-DUTY

*The One Machine that
Keeps Up with the Baler!*

UNIT 1020A . . . Perfectly
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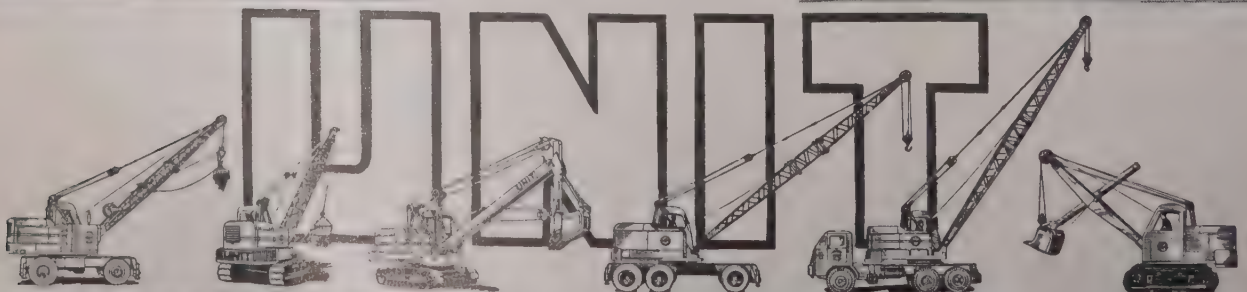
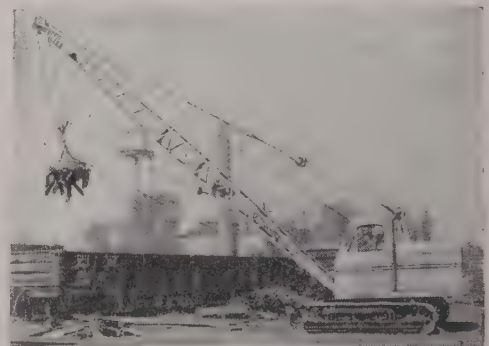
The UNIT 1020A is designed and built for heavy-duty scrap yard operation. Extra long crawlers, wider axles and shoes, plus additional counterweight, provide perfect balance and all-around stability. Tipping strains are absorbed by hook-rollers. Owners using 45 inch magnets find them easy to handle. With full loads, there's no weaving or rocking. It has power and stability without bulk . . . fast on the hoist . . . easy on the swing. To modernize your yard — start with a UNIT 1020A.

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Quickly convertible to hook, clam-shell or magnet, the UNIT 1020A can handle every scrap yard job.

The UNIT 1020A handles heavy steel, baled or loose scrap with day-in and day-out dependability.



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Market Unsteady After Slipping \$2 a Ton

New York

• • • The scrap market was dealt a severe blow this week. In most areas it is down generally \$2 a ton—and it is still groggy. In fact, what happens from here on is anybody's guess. It could dip farther, it could bounce back, or it could settle down at present levels.

No. 1 heavy melting steel dropped \$2 a ton at Pittsburgh and Philadelphia. At Chicago it fell \$2.25. This makes the scrap composite price \$40.92 a gross ton, down \$2.08 a ton from the previous week.

Consumers were not rushing to purchase, even at the lower prices. Cancellations of old orders have been reported in some areas. In some areas it was hard to establish prices because it was difficult to find sales at any price. Springboards, formerly paid by most mills, have been discontinued. There is nothing to indicate that they will be back in the near future.

Cast grades, too, are generally down \$1 and \$2. Many foundries are reported out of the market. But no real pattern has developed.

PITTSBURGH—Purchase by Carnegie-Illinois of a quantity of openhearth scrap reportedly in excess of 10,000 tons sent those grades down \$2.00. These grades are now quotable at \$40.50 to \$41.00. Almost every other item on the list was off too. Rails and low phos declined just \$1.00—so did turnings. Railroad specialties were down \$1.50. Elimination of the springboard here also dropped the actual delivered cost of free market material. The springboard will probably remain extinct for as long as current supply-demand conditions continue in this area. Cast grades continued weakness, with a recent purchase at \$60 sending mixed yard cast down \$4.00.

CHICAGO—Carnegie-Illinois' purchase last week was small as predicted. Dealers immediately lowered their yard price on unprepared scrap. This price last week was \$32.50 a gross ton. The price of railroad specialties again slipped further. Malleable scrap is very weak due to the improved pig iron supply. Rails aren't any better. Cast iron car wheels are being freely offered with few takers. All in all there is no market. Springboards formerly paid by most mills have been discontinued. Carnegie remains the only mill that will accept earmarked scrap. This mill told IRON AGE they will soon

pay \$2.00 over the now published No. 1 heavy melting price for good earmarked scrap. How long this will last is uncertain. The market has entered the new year with a good case of the shakes. Carnegie-Illinois Steel immediately after placing their new order for \$40 scrap cancelled all shipments.

CLEVELAND—An open market prevails here and in the Valley and the trend is to forget the formula. At the moment, the market is so soft that buyers wouldn't pay a dollar springboard on No. 1 that came from Cuba. Shipments are good, and the market shows no signs of firming. Bad weather might bring about a temporary delaying action, but scrap prices are being knocked down a little bit at a time all along the line. First stability may come late this spring or early summer, if the present trend continues. Mills have a lot of high priced inventory, and one of the major factors of price support in this area is the fact that the bulk of the scrap is in the steel mills and not in dealers' yards, proving that it's a poor rule that doesn't work both ways. Brokers are now looking for restoration of the differential between No. 2 bundles and No. 2 steel by mills.

DETROIT—Practically all classes of scrap buyers remained on the sidelines again this week. Buying continues at formula prices but this is more a formality and a habit. The comfortable position of the local mines, unusually favorable weather conditions and the present inactivity of many local jobbing foundries has reduced scrap activity to a walk. Meanwhile, the last whisper about over-the-market deals has disappeared. All signs point to a further downward movement of prices but this isn't likely to be reflected pricewise until February contracts are placed, according to local sources.

BUFFALO—It was a buyers' market without buyers here this week. But principal mills, sitting on the biggest stockpiles in years were having none of it. Dealers and brokers generally agreed the going prices on openhearth steel was off about \$2 and those on No. 1 steel about \$1 to \$2. One leading trader said he thought there would be no business of consequence until after the 3-day convention of the Scrap Institute which opens Sunday at Cincinnati.

PHILADELPHIA—No. 1 melting has been sold \$2.00 under the previous market, bringing the delivered price range to \$42.00 to \$43.00. Mills are still out of the market on new orders for other grades, to permit the new market pattern to jell. Dealers report that they are offering several dollars less for scrap. Dealer reaction to the cuts is moderate. Pipe mills are still out of the cast market, and there is general weakening in the cast market.

Heavy axle turnings and low phos grades have been sold at \$46.00. Dealers are not reaching out for new business in this period as their inventories are low and they are still shipping on old orders. However some mills have cancelled outstanding tonnage.

CINCINNATI—In the aftermath of a price break, the scrap market here is as cold as a mackerel. Old orders will keep it alive until the end of the month, when the major consumers of the area are expected to come in at lower prices. Key jab at the formula prices was landed by Portsmouth Steel Corp., which got in and got out like a flyweight champion. Brokers are trying to pare the buying prices on unprepared material to the bone and trying to keep yard inventories at a minimum. Some foundries in the area haven't taken anything for a month, and are standing fast for the market to reach something approaching stability.

NEW YORK—Scrap is generally down \$2 a ton in this area. This is true of both melting and cast grades. The market is extremely unsettled. Many orders are still being filled at the old, higher prices. But new business is mostly being done for \$2 less. There has been some cancellation of old orders. Brokers are cautious. They are hopeful that the market will settle down within a few days. But that is only a hope.

BOSTON—Activity hit a new low in the scrap market here. But the little business being transacted was generally \$2 a ton lower. Consumers were reluctant to place orders even at the lower prices. Mills are more rigid in their specifications than they have been for a long time.

BIRMINGHAM—No. 2 heavy melting, No. 2 bundles and No. 1 busheling have dropped \$2.50 per ton in this area and the scrap market undertone is weaker generally. The larger consumers of cast iron, including soil pipe producers at Anniston, are reported out of the market although considerable tonnages are being offered. Republic Steel Corp., largest consumer of openhearth material in the Birmingham district, no longer is absorbing extra freight. Quality of all grades has improved.

ST. LOUIS—The scrap iron market is weak, and prices paid by consumers are unchanged only because they are not buying. One large steel mill has not indicated when it set its buying prices for January, while another is expected momentarily to do so at prices which are expected to be lower in line with reductions in other markets. Dealers purchases would be from \$2 to \$5 below present quotations. Shipments are light because of the uncertainty as to the market.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$40.50 to \$41.00
RR. hvy. melting	43.50 to 44.00
No. 2 hvy. melting	40.40 to 41.00
RR. scrap rails	57.00 to 58.00
Rails 2 ft and under	59.00 to 60.00
No. 1 comp'd bundles	40.50 to 41.00
Hand bldd. new shts.	40.50 to 41.00
Hvy. axle turn.	43.50 to 44.50
Hvy. steel forge turn.	43.50 to 44.50
Mach. shop turn.	36.50 to 37.00
Shoveling turn.	38.00 to 39.00
Mixed bor. and turn.	36.50 to 37.00
Cast iron borings	38.50 to 39.00
No. 1 mach. cast	67.50 to 68.50
Mixed yard cast	59.50 to 60.00
Hvy. breakable cast	57.00 to 58.00
Malleable	70.00 to 71.00
RR. knuck. and cup.	55.50 to 56.50
RR. coil springs	55.50 to 56.50
RR. leaf springs	55.50 to 56.50
Roller steel wheels	55.50 to 56.50
Low phos.	47.50 to 48.50

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$39.00 to \$40.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 bundles	39.00 to 40.00
No. 2 dealers' bundles	39.00 to 40.00
Bundled mach. shop turn.	39.00 to 40.00
Galv. bundles	37.00 to 38.00
Mach. shop turn.	34.50 to 35.00
Short shov. turn.	36.50 to 37.00
Cast iron borings	35.50 to 36.00
Mix. borings and turn.	34.50 to 35.00
Los phos. hvy. forge	46.00 to 46.50
Los phos. plates	44.00 to 44.50
No. 1 RR. hvy. melt.	43.75 to 44.25
Rerolling rails	59.00 to 60.00
Miscellaneous rails	53.00 to 54.00
Angles & splice bars	48.00 to 50.00
Locomotive tires, cut	48.00 to 50.00
Cut bolster & side frames	46.00 to 48.00
Standard stl. car axles	74.00 to 75.00
No. 3 steel wheels	47.00 to 48.00
Couplers and knuckles	47.00 to 48.00
Rails, 2 ft and under	56.00 to 57.00
Malleable	65.00 to 70.00
No. 1 mach. cast	60.00 to 62.00
No. 1 agricul. cast.	57.00 to 60.00
Heavy breakable cast.	56.00 to 57.00
RR. grate bars	56.00 to 57.00
Cast iron brake shoes	55.00 to 56.00
Cast iron car wheels	56.00 to 59.00

CINCINNATI

Per gross ton, f.o.b. cars:

No. 1 hvy. melting	\$38.40 to \$38.90
No. 2 hvy. melting	38.40 to 38.90
No. 1 bundles	38.40 to 38.90
No. 2 bundles	38.40 to 38.90
Mach. shop turn.	33.40 to 33.90
Shoveling turn.	35.40 to 35.90
Cast iron borings	34.40 to 34.90
Mixed bor. & turn.	35.40 to 35.90
Low phos. 18 in. under	46.00 to 47.00
No. 1 cupola cast.	62.00 to 63.00
Hvy. breakable cast.	55.00 to 56.00
Rails 18 in. and under	61.00 to 62.00
Rails random length	55.00 to 56.00
Drop broken	66.00 to 67.00

BOSTON

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$35.00 to \$36.90
No. 2 hvy. melting	32.40
Nos. 1 and 2 bundles	32.40
Bushelings	32.40
Shoveling turn.	29.00 to 31.00
Machine shop turn.	27.40 to 29.00
Mixed bor. and turn.	27.40 to 29.00
Cl'n cast chem. bor.	36.00 to 37.00
No. 1 machinery cast.	62.00 to 63.00
No. 2 machinery cast.	51.00
Heavy breakable cast.	50.50
Stove plate	50.00 to 51.00

DETROIT

Per gross ton, brokers' buying prices f.o.b. cars:

No. 1 hvy. melting	\$38.00
No. 2 hvy. melting	38.00
No. 1 bundles	38.00
New busheling	38.00
Flashings	38.00
Mach. shop turn.	\$31.00 to 32.00
Machinery cast	60.00 to 62.00
Mixed yard cast	56.00 to 57.00
Shoveling turn.	31.50 to 32.00
Cast iron borings	32.50 to 33.00
Mixed bor. & turn.	31.50 to 32.00
Low phos. plate	42.50 to 43.00
Heavy breakable cast.	53.00 to 57.00
Stove plate	57.00 to 58.00
Automotive cast.	64.00 to 66.00

Going prices as obtained in the trade by THE IRON AGE, based on representative tonnages.

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	39.00 to 39.50
No. 1 bundles	42.00 to 43.00
No. 2 bundles	39.00 to 39.50
Mach. shop turn.	36.00 to 37.00
Shoveling turn.	39.00 to 39.50
Mixed bor. and turn.	36.00 to 37.00
Clean cast chemical bor.	42.00 to 43.00
No. 1 machinery cast	62.00 to 63.00
No. 1 mixed yard cast.	58.00 to 59.00
Hvy. breakable cast.	58.00 to 59.00
Hvy. axle forge turn.	45.00 to 46.00
Low phos. acid, openhearth.	45.00 to 46.00
Low phos., electric furnace	48.00 to 49.00
Low phos. bundles	45.00 to 46.00
RR. steel wheels	52.00 to 53.00
RR. coil springs	52.00 to 53.00
RR. malleable	76.00 to 77.00
Cast iron carwheels	64.00 to 65.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	39.50 to 40.50
Bundled sheets	39.50 to 40.50
Mach. shop turn.	32.00 to 34.00
Shoveling turnings	35.00 to 36.00
Locomotive tires, uncut	47.00 to 48.00
Mis. std. sec. rails	55.00 to 57.00
Steel angle bars	53.00 to 54.00
Rails 3 ft and under	60.00 to 62.00
RR. steel springs	49.00 to 50.00
Steel car axles	73.00 to 75.00
Brake shoes	54.00 to 56.00
Malleable	75.00 to 77.00
Cast iron car wheels	64.00 to 65.00
No. 1 machinery cast.	66.00 to 67.00
Hvy. breakable cast.	60.00 to 61.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$37.50
No. 2 hvy. melting	37.50
No. 2 bundles	37.50
No. 1 busheling	37.50
Long turnings	\$32.00 to 33.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	29.50
Bar crops and plate	42.00 to 43.00
Structural and plate	42.00 to 43.00
No. 1 cupola cast.	68.00 to 70.00
Stove plate	65.00 to 67.00
No. 1 RR. hvy. melt.	41.00
Steel axles	65.00 to 68.00
Scrap rails	48.00 to 49.00
Rerolling rails	65.00 to 67.00
Angles & splice bars	53.00 to 54.00
Rails 3 ft & under	53.00 to 54.00
Cast iron carwheels	63.00 to 64.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$40.50 to \$41.00
No. 2 hvy. melting	40.50 to 41.00
Mach. shop turn.	34.00 to 35.00
Short shov. turn.	36.00 to 37.00
Cast iron borings	35.00 to 36.00
Low phos.	46.00 to 48.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$36.50 to \$37.00
No. 2 hvy. melting	35.00
No. 2 bundles	35.00
Mach. shop turn.	29.50 to 30.00
Mixed bor. & turn.	29.50 to 30.00
Shoveling turnings	31.50 to 32.00
Machinery cast	56.00 to 57.00
Mixed yard cast	62.25 to 63.25
Heavy breakable cast.	51.50 to 52.50
Charging box cast.	51.50 to 52.50
Unstry. motor blks.	51.00 to 52.00
Cl'n cast chem. bor.	36.50 to 37.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$47.00 to \$48.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	40.00 to 41.00
No. 2 bundles	40.00 to 41.00
No. 1 busheling	40.00 to 41.00
Mach. shop turn.	36.75 to 37.25
Shoveling turn.	38.75 to 39.25
Cast iron borings	37.75 to 38.25
Mixed bor. and turn.	36.75 to 37.25
Clean auto. cast.	64.00 to 66.00
Mixed yard cast.	60.00 to 63.00
Stove plate	60.00 to 63.00
RR. malleable	70.00 to 75.00
Small indus. malleable	47.00 to 49.00
Low phos. plate	47.00 to 49.00
Scrap rails	58.00
Rails 3 ft & under	63.00 to 64.00
RR. steel wheels	53.00 to 54.00
RR. coil & leaf spgs.	56.00 to 57.00
RR. knuckles & coup.	56.00 to 57.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$40.00 to \$40.50
No. 2 hvy. melting	40.00 to 40.50
No. 1 bundles	42.00 to 42.50
No. 1 busheling	40.00 to 40.50
Drop forge flashings	40.00 to 40.50
Mach. shop turn.	33.00 to 34.00
Shoveling turn.	35.00 to 36.00
Steel axle turn.	40.00 to 40.50
Cast iron borings	34.00 to 35.00
Mixed bor. & turn.	36.50 to 37.00
Low phos. 2 ft and under	45.00 to 46.00
No. 1 machinery cast.	65.00 to 67.00
Malleable	75.00 to 77.00
RR. cast.	70.00 to 71.00
Railroad grate bars	55.00 to 56.00
Stove plate	58.00 to 59.00
RR. hvy. melting	43.00 to 43.50
Rails 3 ft and under	61.00 to 62.00
Rails 18 in. and under	62.00 to 63.00

SAN FRANCISCO

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$27.50
No. 2 hvy. melting	27.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	18.00
Elec. fur. 1 ft under	\$40.00 to 42.00
No. 1 cupola cast.	58.00 to 60.00
RR. hvy. melting	28.50
Rails	29.00

LOS ANGELES

Per gross ton, f.o.b. shipping point:

No. 1 hvy. melting	\$27.50
No. 2 hvy. melting	27.50
No. 1 bales	37.50
No. 2 bales	27.50
No. 3 bales	24.50
Mach. shop turn.	20.00
Elec. fur. 1 ft under	\$40.00 to 42.00
No. 1 cupola cast.	40.00 to 50.00
RR. hvy. melting	28.50

SEATTLE

Per gross ton delivered to consumer:

No. 1 & No. 2 hvy. melt.	\$30.00 to \$33.50
Elec. fur. 1 ft and under	36.50 to 40.00
No. 1 cupola cast.	40.00 to 40.50
RR. hvy. melting	30.00 to 32.50

HAMILTON, ONT.

Per gross ton delivered to consumer: Cast grades f.o.b. shipping point:

Heavy melting	\$23.00*
No. 1 bundles	23.00*
No. 2 bundles	22.50*
Mechanical bundles	21.00*
Mixed steel scrap	19.00*
Mixed borings and turnings	17.00*
Rails, remodeling	23.00*
Rails, rerolling	26.00*
Bushelings	17.50*
Bushelings, new fact, prop'd.	21.00*
Bushelings, new fact, unprop'd.	16.00*
Short steel turnings	17.00*
No. 1 cast	\$48.00 to 50.00*
No. 2 cast	44.00 to 45.00*

*Ceiling Price

*For the Purchase or Sale of
Iron and Steel Scrap . . .*

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices . .

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel:	Jan. 11, 1949	Jan. 4, 1949	Dec. 14, 1948	Jan. 13, 1948
(cents per pound)				
Hot-rolled sheets	3.26	3.26	3.26	2.80
Cold-rolled sheets	4.00	4.00	4.00	3.55
Galvanized sheets (10 ga)	4.40	4.40	4.40	3.95
Hot-rolled strip	3.265	3.265	3.265	2.80
Cold-rolled strip	4.063	4.063	4.063	3.55
Plates	3.42	3.42	3.42	2.95
Plates wrought iron	7.85	7.85	7.85	6.85
Stains C-R strip (No. 302)	33.25	33.25	33.25	30.50

Tin and Terneplate:

(dollars per base box)				
Tinplate (1.50 lb) cokes	\$7.75	\$7.75	\$6.80	\$6.80
Tinplate, electro (0.50 lb)	6.70	6.70	6.00	6.00
Special coated mfg. ternes	6.65	6.65	5.90	5.90

Bars and Shapes:

(cents per pound)				
Merchant bars	3.37	3.37	3.37	2.90
Cold-finished bars	3.995	3.995	3.995	3.55
Alloy bars	3.75	3.75	3.75	3.30
Structural shapes	3.25	3.25	3.25	2.80
Stainless bars (No. 302)	28.50	28.50	28.50	26.00
Wrought iron bars	9.50	9.50	9.50	7.15

Wire:

(cents per pound)				
Bright wire	4.256	4.256	4.256	3.55

Rails:

(dollars per 100 lb)				
Heavy rails	\$3.20	\$3.20	\$3.20	\$2.75
Light rails	3.55	3.55	3.55	3.10

Semifinished Steel:

(dollars per net ton)				
Rerolling billets	\$52.00	\$52.00	\$52.00	\$45.00†
Slabs, rerolling	52.00	52.00	52.00	45.00†
Forging billets	61.00	61.00	61.00	55.00†
Alloy blooms, billets, slabs	63.00	63.00	63.00	66.00†

Wire rod and Skelp:

(cents per pound)				
Wire rods	3.619	3.619	3.619	2.80
Skelp	3.25	3.25	3.25	2.60

† Gross ton

Pig Iron:

	Jan. 11, 1949	Jan. 4, 1949	Dec. 14, 1948	Jan. 13, 1948
per gross ton)				
No. 2, foundry, Phila.	\$51.56	\$51.56	\$51.56	\$44.61
No. 2, Valley furnace	46.50	46.50	46.50	39.50
No. 2, Southern Cin'ti.	49.47	49.47	49.47	43.28
No. 2, Birmingham	43.38	43.38	43.38	37.38
No. 2, foundry, Chicago†	46.00	46.00	46.00	39.00
Basic del'd Philadelphia	50.76	50.76	50.76	44.11
Basic, Valley furnace	46.00	46.00	46.00	39.00
Malleable, Chicago†	46.50	46.50	46.50	38.50
Malleable, Valley	46.50	46.50	46.50	39.50
Charcoal, Chicago	73.78	73.78	73.78	62.46
Ferromanganese†	161.71	161.71	161.71	145.00

† The switching charge for delivery to foundries in the Chicago district is \$1 per ton.

† Average of U. S. prices quoted on Ferroalloy page.

Scrap

(per gross ton)				
Heavy melt'g steel, P'gh.	\$40.75	\$42.75	\$42.75	\$40.50
Heavy melt'g steel, Phila.	42.50	44.50	44.50	41.50
Heavy melt'g steel, Ch'go	39.50	41.75	41.75	39.75
No. 1, hy. comp. sh't, Det.	38.00	38.00	38.00	35.25
Low phos. Young'n.	47.00	47.75	47.75	47.75
No. 1, cast, Pittsburgh	68.00	68.00	70.00	55.00
No. 1, cast, Philadelphia	62.50	63.50	65.50	58.00
No. 1, cast, Chicago	61.00	61.00	70.00	69.50

Coke, Connellsville:

(per net ton at oven)				
Furnace coke, prompt	\$17.00	\$17.00	\$15.00	\$12.50
Foundry coke, prompt	17.00	17.00	17.00	14.00

Nonferrous Metals:

(cents per pound to large buyers)				
Copper, electro, Conn.	23.50	23.50	23.50	21.50
Copper, Lake Conn.	23.625	23.625	23.625	21.625
Tin, Grade A, New York	\$1.03	\$1.03	\$1.03	94.00
Zinc, East St. Louis	17.50	17.50	17.50	10.50
Lead, St. Louis	21.30	21.30	21.30	14.80
Aluminum, virgin	17.00	17.00	17.00	15.00
Nickel, electrolytic	42.90	42.90	42.90	36.56
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	38.50	38.50	38.50	33.00

Starting with the issue of Apr. 23, 1943, the weighted finished steel index was revised for the years 1941, 1942, and 1943. See explanation of the change on p. 90 of the Apr. 23, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite price for the current quarter is an estimate based on finished steel shipments for the previous quarter. This figure will be revised when shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL (Base Price)

Jan. 11, 1949	3.75628¢ per lb.
One week ago	3.75628¢ per lb.
One month ago	3.75628¢ per lb.
One year ago	3.22566¢ per lb.

PIG IRON

....\$46.82	per gross ton....
....\$46.82	per gross ton....
....\$46.82	per gross ton....
....\$40.08	per gross ton....

SCRAP STEEL

.....\$40.92	per gross ton.....
.....\$43.00	per gross ton.....
.....\$43.00	per gross ton.....
.....\$40.58	per gross ton.....

HIGH

LOW

1949....	3.75628¢	Jan. 1	3.75628¢	Jan. 1
1948....	3.75700¢	July 27	3.22566¢	Jan. 1
1947....	3.19541¢	Oct. 7	2.87118¢	Jan. 7
1946....	2.83599¢	Dec. 31	2.54490¢	Jan. 1
1945....	2.44104¢	Oct. 2	2.54490¢	Jan. 2
1944....	2.30837¢	Sept. 5	2.21189¢	Oct. 5
1943....	2.29176¢		2.29176¢	
1942....	2.28249¢		2.28249¢	
1941....	2.43078¢		2.43078¢	
1940....	2.30467¢	Jan. 2	2.24107¢	Apr. 16
1939....	2.35367¢	Jan. 3	2.26689¢	May 16
1938....	2.58414¢	Jan. 4	2.27207¢	Oct. 18
1937....	2.58414¢	Mar. 9	2.32263¢	Jan. 4
1936....	2.32263¢	Dec. 28	2.05200¢	Mar. 10
1935....	2.07642¢	Oct. 1	2.06492¢	Jan. 8
1934....	2.15367¢	Apr. 24	1.95757¢	Jan. 2
1933....	1.95578¢	Oct. 3	1.75836¢	May 2
1932....	1.89196¢	July 5	1.83901¢	Mar. 1
1931....	1.99626¢	Jan. 13	1.86586¢	Dec. 29
1929....	2.31773¢	May 28	2.26498¢	Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing major portion of finished steel shipments. Index recapitulated in Aug. 28, 1941, issue.

HIGH

LOW

\$46.82	Jan. 1	\$46.82	Jan. 1
46.82	Oct. 12	39.58	Jan. 6
37.98	Dec. 30	30.14	Jan. 7
30.14	Dec. 10	25.37	Jan. 1
25.37	Oct. 23	23.61	Jan. 2
\$23.61		\$23.61	
23.61		23.61	
23.61		23.61	
\$23.61	Mar. 20	\$23.45	Jan. 2
23.45	Dec. 23	22.61	Jan. 2
22.61	Sept. 19	20.61	Sept. 12
23.25	June 21	19.61	July 6
23.25	Mar. 9	20.25	Feb. 16
19.74	Nov. 24	18.73	Aug. 11
18.84	Nov. 5	17.83	May 14
17.90	May 1	16.90	Jan. 27
16.90	Dec. 5	13.56	Jan. 3
14.81	Jan. 5	13.56	Dec. 6
15.90	Jan. 6	14.79	Dec. 15
18.71	May 14	18.21	Dec. 17

Based on averages for basic iron at valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

HIGH

LOW

\$43.00	Jan. 1	\$40.92	Jan. 11
43.16	July 27	39.75	Mar. 9
42.58	Oct. 28	29.50	May 20
31.17	Dec. 24	19.17	Jan. 1
19.17	Jan. 2	18.92	May 22
19.17	Jan. 11	15.76	Oct. 24
\$19.17		\$19.17	
19.17		19.17	
\$22.00	Jan. 7	\$19.17	Apr. 10
21.83	Dec. 30	16.04	Apr. 9
22.50	Oct. 3	14.08	May 16
15.00	Nov. 22	11.00	June 7
21.92	Mar. 30	12.67	June 9
17.75	Dec. 21	12.67	June 8
13.42	Dec. 10	10.33	Apr. 29
13.00	Mar. 13	9.50	Sept. 25
12.25	Aug. 8	6.75	Jan. 3
8.50	Jan. 12	6.43	July 5
11.33	Jan. 6	8.50	Dec. 29
17.58	Jan. 29	14.08	Dec. 8

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

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Iron and Steel Prices . . .

Steel prices shown here are f.o.b. producing points in cents per pound unless otherwise indicated. Extras apply. (1) Commercial quality sheet grade; prices, 0.25¢ above base. (2) Commercial quality grade. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Cokes, 1.25 lb, deduct 25¢ per base box. (6) 18 gage and heavier. (7) For straight length material only from producers to fabricators. (8) Also shafting. For quantities of 40,000 lb and over. (9) Carload lot in manufacturing trade. (10) Hollowware enameling, gages 29 to 31 only. (11) Produced to dimensional tolerances in AISI Manual Sec. 6. (12) Slab prices subject to negotiation in most cases. (13) San Francisco only. (14) Los Angeles only. (15) San Francisco and Los Angeles only. (16) Seattle only. (17) Seattle and Los Angeles only.

PRODUCTS	Base prices at producing points apply to the sizes and grades produced in these areas															
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio			Detroit	Johns- town	Seattle, S. Frisco, Los Angeles	Fontana
INGOTS	\$50.00															
Carbon forging																
Alloy	\$51.00						(per net ton)									
BILLETS, BLOOMS, SLABS	\$52.00				\$52.00	\$52.00	(per net ton)							\$52.00		
Carbon, rerolling ^{1,2}																
Carbon forging billets	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	\$61.00	(per net ton)							\$61.00		
Alloy	\$63.00	\$63.00				\$63.00	(Bethlehem, Canton, Massillon = \$63.00) (per net ton)									
PIPE SKELP	3.25						3.25				Warren = 3.25					
WIRE RODS	3.40 to 4.15	3.40 to 3.90		3.40	3.40		3.65	3.50			Worcester 3.70		3.40	4.05 ^{1,3} 4.10 ^{1,4}		
SHEETS																
Hot-rolled ⁶	3.25 to 3.30	3.25	3.25	3.25- 3.30	3.25	3.25	3.25	3.25		Warren, Ashland = 3.25		3.45		3.95 ^{1,5}		5.65
Cold-rolled ¹	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.70	4.00	Warren 4.00	4.20		Pittsburg, Cal. 4.95		
Galvanized (10 gage)	4.40	4.40	4.40		4.40			4.40	Canton = 4.40	4.40	Ashland = 4.40			5.15 ^{1,5}		
Enameling (12 gage)	4.40	4.40	4.40	4.40			4.40		4.60	4.40		4.70				
Long ternes ³ (10 gage)	4.80		4.80							4.80						
STRIP																
Hot-rolled ³	3.25 to 3.30	3.25 to 3.30	3.25	3.25 to 3.30	3.25	3.25	3.25	3.25		3.25	Warren = 3.25	3.45		4.00 to 4.25		5.90
Cold-rolled ⁴	4.00	4.25		4.00	4.00	4.00	4.00	4.00			New Haven 4.50 Warren = 4.00 to 4.25	4.20 to 4.50				7.10
TINPLATE																
Cokes, 1.50 lb. ⁸ base box	\$7.75	\$7.75	\$7.75		\$7.85			\$7.85	\$7.95	Warren, Ohio = \$7.75					Pittsburg, Cal. = \$8.50	
Electrolytic 0.25, 0.50, 0.75 lb. box	Deduct \$1.30, \$1.05 and 75¢ respectively from 1.50 lb. coke base box price															
TERNES MFG., special coated	Deduct \$1.10 from 1.50 lb. coke base box price															
BLACKPLATE CANMAKING 55 to 128 lb.	Deduct \$2.00 from 1.50 lb. coke base box price															
BLACKPLATE, h.e., 29 ga. ¹⁰	5.30	5.30	5.30					5.40		Warren, Ohio = 5.30						
BARS																
Carbon Steel	3.35 to 3.55	3.35	3.35	3.35	3.35	3.35	3.35	3.35		3.35	Canton = 3.35	3.65	3.35	4.05 to 4.10		5.30
Reinforcing (billet) ⁷	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35			Canton = 3.35		3.35	4.05 to 4.10		5.30
Cold-finished ⁹	3.95 to 4.00	4.00	4.00	4.00		4.00	4.00					4.30				
Alloy, hot-rolled	3.75	3.75	3.75			3.75	3.75		Bethlehem, Canton, Massillon = 3.75			4.05	3.75	4.80 ^{1,4}		5.60
Alloy cold-drawn	4.65 to 4.75	4.65	4.65	4.65		4.65	4.65		Massillon = 4.65	Worcester 4.95						
PLATE																
Carbon steel ¹¹	3.40 to 3.60	3.40	3.40	3.40 to 3.60	3.40 Cons	3.45 hohocken	3.40 = 3.95	3.45	Coatesville = 3.75, Claymont = 3.95 Geneva = 3.40, Harrisburg = 6.50			3.65	3.45	4.30 ^{1,6}		5.80
Floor plates	4.55	4.55		4.55					Cons hohocken = 4.55							
Alloy	4.40	4.40							Coatesville = 5.10							
SHAPES, Structural	3.25 to 3.30	3.25	3.25		3.25	3.30			Bethlehem = 3.30, Geneva, Utah = 3.25				3.30	3.85 to 4.30		5.75
MANUFACTURERS' WIRE ⁹																
Bright	4.15 to 4.50	4.15 to 4.65		4.15	4.15		4.15	4.25	Duluth = 4.15, Worcester = 4.45				4.15	5.15 ^{1,3}		
Spring (high carbon)	5.20	5.20		5.20				5.30	Worcester = 5.50 New Haven, Trenton = 5.50				5.20	Duluth = 5.20-6.15		
PILING, Steel sheet	4.05	4.05				4.05										

STAINLESS STEELS

Base prices, in cents per pound, f.o.b. producing point

Product	Chromium Nickel						Straight Chromium		
	301	302	303	304	316	347	410	418	430
Ingots, rerolling.....	12.75	13.50	15.00	14.50	22.75	20.00	11.25	13.75	11.50
Slabs, billets, rerolling.....	17.00	18.25	20.25	19.25	30.25	26.75	15.00	18.50	15.25
Forging discs, die blocks, rings.....	30.50	30.50	33.00	32.00	49.00	41.00	24.50	25.00	25.00
Billets, forging.....	24.25- 26.50	24.25- 26.50	26.25- 28.75	25.50- 27.75	39.00- 42.75	32.75- 35.75	19.50- 21.50	20.00- 21.75	20.00- 21.75
Bars, wire, structurals.....	28.50	28.50	31.00	30.00	46.00	38.50	23.00	23.50	23.50
Plates.....	32.00	32.00	34.00	34.00	50.50	44.00	26.00	26.50	26.50
Sheets.....	37.50- 40.75	37.50- 40.75	39.50- 43.00	39.50- 43.00	53.00- 57.25	50.00- 54.00	33.00	33.50	35.50
Strip, hot-rolled.....	24.25	25.75	30.00	27.75	46.00	38.75	21.25	28.00	21.75
Strip, cold-rolled.....	30.50- 30.75	33.00- 33.50	36.50- 39.50	35.00- 35.75	55.00- 57.25	48.50- 50.00	27.00	33.50	27.50

ELECTRODES

Cents per lb, f.o.b. plant, threaded electrodes with nipples, unboxed

Diameter in in.	Length in in.	
Graphite		
17, 18, 20	60, 72	16.00¢
8 to 16	48, 60, 72	16.50¢
7	48, 60	17.75¢
6	48, 60	19.00¢
4, 5	40	19.50¢
3	40	20.50¢
2½	24, 30	21.00¢
2	24, 30	23.00¢
Carbon		
40	100, 110	7.50¢
35	65, 110	7.50¢
30	65, 84, 110	7.50¢
24	72 to 104	7.50¢
17 to 20	84, 90	7.50¢
14	60, 72	8.00¢
10, 12	60	8.25¢
8	60	8.50¢

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	90.5¢
18	4	1	—	5	\$1.42
18	4	2	—	—	\$1.025
1.5	4	1.5	8	—	65¢
6	4	2	6	—	69.5¢
High-carbon-chromium.....					52¢
Oil harden manganese.....					29¢
Special carbon.....					26.5¢
Extra carbon.....					22¢
Regular carbon.....					19¢
Warehouse prices on and east of Mississippi are 2½¢ per lb higher. West of Mississippi, 4½¢ higher.					

ELECTRICAL SHEETS

Base, HR cut lengths, f.o.b. mill

	Cents per lb
Armature.....	5.45
Electrical.....	5.95
Motor.....	6.70 to 9.20
Dynamo.....	7.50 to 10.00
Transformer 72.....	8.05 to 11.80
Transformer 65.....	8.60 to 12.35
Transformer 58.....	9.30 to 13.05
Transformer 52.....	10.10

RAILS, TRACK SUPPLIES

F.o.b. mill

Standard rails, 100 lb and heavier, No. 1 quality, per 100 lb.....	\$3.20†
Joint bars, 100 lb.....	4.25
Light rails (from billets) per 100 lb.....	3.55

Base Price cents per lb

Track spikes.....	5.35
Axles.....	5.20
Screw spikes.....	8.00
Tie plates.....	4.05
Tie plates, Pittsburg, Calif.*.....	4.20
Track bolts, untreated.....	8.25
Track bolts, heat treated, to railroads.....	8.50
*Seattle, add 30¢.	
CF&I and Inland, \$3.50.	

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon.....	4.00¢
0.41 to 0.60 carbon.....	5.50¢
0.61 to 0.80 carbon.....	6.10¢
0.81 to 1.05 carbon.....	8.05¢
1.06 to 1.35 carbon.....	10.35¢
Worcester, add -0.30¢.	

CLAD STEEL

Base prices, cents per pound

Stainless clad	Plate	Sheet
No. 304, 20 pct, f.o.b. Coatesville, Pa.....	*26.50	
Washington, Pa.....	*26.50	*22.50
Claymont, Del.....	*26.50	
Conshohocken, Pa.....		*22.50
Nickel-clad		
10 pct f.o.b. Coatesville, Pa.....	27.50	
Inconel-clad		
10 pct, f.o.b. Coatesville, Monel-clad.....	36.00	
10 pct, f.o.b. Coatesville, Aluminized steel sheets.....	29.00	
Hot dip, 20 gage, f.o.b. Butler, Pa.....		9.25

* Includes annealing and pickling, or sandblasting.

MERCHANT WIRE PRODUCTS

To the dealer, f.o.b. mill

	Base Column	Pittsburg, Calif.
Standard & coated nails* 103.....	123	
Galvanized nails*.....	103	123
Woven wire fence†.....	109	132
Fence posts, carloads††.....	114	
Single loop bale ties.....	106	130
Galvanized barbed wire** 123.....	143	
Twisted barless wire... 123.....		...

* Pgh., Chl., Duluth; Worcester, 6 columns higher. † 1½" gage and heavier. ** On 80 rod spools, in carloads. †† Duluth only.

	Base per 100 lb	Pittsburg, Calif.
Annealed fence wire†.....	\$4.80	\$5.75
Annealed, galv. fencing†.....	5.25	6.20
Cut nails, carloads††.....	6.75	...

† Add 30¢ at Worcester; 10¢ at Sparrows Pt.
†† Less 20¢ to jobbers.

HIGH STRENGTH, LOW ALLOY STEELS

Mill base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	HI Steel	Mayari R	Otiscoloy	Yoloy	NAX High Tensile
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	Great Lakes Steel
Plates.....	5.20	5.20	5.20	5.30	5.20	5.30	5.20	5.40	5.65
Sheets									
Hot-rolled.....	4.95	4.95	4.95	5.25	4.95	4.95	4.95	5.15	5.25
Cold-rolled.....	6.05	6.05	6.05	....	6.05	6.05	6.05	6.25	6.35
Galvanized.....	....	6.75	....	....	....	6.75	....	....	....
Strip									
Hot-rolled.....	4.95	4.95	4.95	....	4.95	4.95	4.95	5.15	5.25
Cold-rolled.....	....	....	6.05	....	....	6.05	6.05	....	6.35
Shapes									
.....	....	4.95	....	....	4.95	5.05	4.95	....	....
Beams									
.....	....	4.95	....	....	....	....	....	....	....
Bars									
Hot-rolled.....	5.10	5.10	5.10	....	5.10	5.10	5.10	....	5.40
Bar shapes									
.....	....	5.10	....	....	5.10	5.10	5.10	....	....

PRICES

PIPE AND TUBING

Base discounts, f.o.b. mills,
Base price, \$200.00 per net ton.

STANDARD, THREADED AND COUPLED

Steel, butt weld	Black	Galv.
1/2-in.	43 to 41	20 to 18
3/4-in.	46 to 44	24 to 22
1-in.	48 1/2 to 46 1/2	27 to 25
1 1/4-in.	49 to 47	27 1/2 to 25 1/2
1 1/2-in.	49 1/2 to 47 1/2	28 to 26
2-in.	50 to 48	28 1/2 to 26 1/2
2 1/2 to 3-in.	50 1/2 to 49 1/2	29 to 27

Steel, lap weld		
2-in.	39 1/2	17 1/2
2 1/2 to 3-in.	39 1/2	21 1/2
3 1/2 to 6-in.	46 1/2 to 42	20 1/2 to 24 1/2

Steel, seamless		
2-in.	38 1/2 to 27	16 1/2 to 5
2 1/2 to 3-in.	41 1/2 to 35	19 1/2 to 10 1/2
3 1/2 to 6-in.	43 1/2 to 38 1/2	21 1/2 to 16 1/2

Wrought Iron, butt weld		
1/2-in.	+20 1/2	+52 1/2
3/4-in.	+10 1/2	+41 1/2
1 & 1 1/4-in.	+4 1/2	+32 1/2
2-in.	+1 1/2	+29
3-in.	+2	+28 1/2

Wrought Iron, lap weld		
2-in.	+7 1/2	+36 1/2
2 1/2 to 3 1/2-in.	+5	+32
4-in.	list	+26
4 1/2 to 8-in.	+2	+27 1/2

EXTRA STRONG, PLAIN ENDS

Steel, butt weld		
1/2-in.	42 to 40	20 1/2 to 18 1/2
3/4-in.	46 to 44	24 1/2 to 22 1/2
1-in.	48 to 46	27 1/2 to 25 1/2
1 1/4-in.	48 1/2 to 46 1/2	28 to 26
1 1/2-in.	49 to 47	28 1/2 to 26 1/2
2-in.	49 1/2 to 47 1/2	29 to 27
2 1/2 to 3-in.	50 to 48	29 1/2 to 27 1/2

Steel, lap weld		
2-in.	39 1/2	18 1/2
2 1/2 to 3-in.	44 1/2	23 1/2
3 1/2 to 6-in.	48 to 44	23 to 27

Steel, seamless		
2-in.	37 1/2 to 32 1/2	16 1/2 to 11 1/2
2 1/2 to 3-in.	41 1/2 to 36 1/2	20 1/2 to 15 1/2
3 1/2 to 6-in.	45	24

Wrought Iron, butt weld		
1/2-in.	+16	+46 1/2
3/4-in.	+9 1/2	+39 1/2
1 to 2-in.	+1 1/2	+28 1/2

Wrought Iron, lap weld		
2-in.	+4 1/2	+33
2 1/2 to 4-in.	+5	+21 1/2
4 1/2 to 6-in.	+1	+26

For threads only, butt weld, lap weld and seamless pipe, one point higher discount (lower price) applies. For plain ends, butt weld, lap weld and seamless pipe 3-in. and smaller, three points higher discount (lower price) applies, while for lap weld and seamless 3 1/2-in. and larger four points higher discount (lower price) applies. On butt weld and lap weld steel pipe, jobbers are granted a discount of 5 pct. On l.c.l. shipments, prices are determined by adding 25 pct and 30 pct and the car-load freight rate to the base card.

BOILER TUBES

Seamless steel and electric welded commercial boiler tubes and locomotive tubes, minimum wall. Prices per 100 ft at mill in carload lots, cut length 4 to 24 ft inclusive.

OD Gage	Seamless	Electric Weld
in. BWG	H.R.	C.R.
2	13	19.18
2 1/2	12	25.79
3	12	28.68
3 1/2	11	35.85
4	10	44.51

CAST IRON WATER PIPE

	Per net ton
6 to 24-in., del'd Chicago	\$106.70
6 to 24-in., del'd N. Y.	103.50 to 108.40
6 to 24-in., Birmingham	93.50
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	120.30
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Consumer Prices

(Bolts and nuts f.o.b. mill Pittsburgh, Cleveland, Birmingham or Chicago)

Base discount less case lots

Machine and Carriage Bolts

	Pct Off List
1/2 in. & smaller x 6 in. & shorter	35
9/16 & 5/8 in. x 6 in. & shorter	37
3/4 in. & larger x 6 in. & shorter	34
All diam, longer than 6 in.	30
Lag, all diam over 6 in. longer	35
Lag, all diam x 6 in. & shorter	37
Flow bolts	47

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller	35
9/16 to 1 in. inclusive	34
1 1/8 to 1 1/2 in. inclusive	32
1 1/2 in. and larger	27
On above bolts and nuts, excepting plow bolts, additional allowance of 15 pct for full container quantities. There is an additional 5 pct allowance for car-load shipments.	

Semifinished Hexagon Nuts

	USS	SAE
7/16 in. and smaller	38	41
1/2 in. and smaller	38	39
1/2 in. through 1 in.	37	37
9/16 in. through 1 1/2 in.	35	37
1 1/2 in. and larger	28	28
In full case lots, 15 pct additional discount.		

Stove Bolts

Packages, nuts separate	\$61.75
In bulk	70.00

Large Rivets

	(1/2 in. and larger)
	Base per 100 lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$6.75
F.o.b. Lebanon, Pa.	6.75

Small Rivets

	(7/16 in. and smaller)
	Pct off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	48

Cap and Set Screws

	(In packages)	Pct Off List
Hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in., SAE 1020, bright	46	
1/2 to 1 in. x 6 in., SAE (1035), heat treated	35	
Set screws, oval points	19	
Milled studs	5	
Flat head cap screws, listed sizes	28	
Fillister head cap, listed sizes	28	

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill.

	Base price per net ton
Effective CaF, Content:	\$37.03
70% or more	34.00
60% or less	

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$7.60
Old range, nonbessemer	7.45
Mesabi, bessemer	7.35
Mesabi, nonbessemer	7.20
High phosphorus	7.20
After Dec. 31, 1948, increases or decreases in Upper Lake freight handling charges or taxes thereon to be for the buyers' account.	

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f.	7.9¢ to 9.0¢
New York, ocean bags	9.0¢ to 15.0¢
Domestic sponge iron, 98+%	9.0¢ to 15.0¢
Fe, carload lots	19.5¢ to 39.5¢
Electrolytic iron, annealed, 99.5+%	48.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+%	63.0¢ to 80.0¢
Hydrogen reduced iron, minus 300 mesh, 98+%	90.0¢ to \$1.75
Carbonyl iron, size 5 to 10 microns, 98%, 99.8%+ Fe	30.00¢
Aluminum	51.17¢
Antimony	27.25 to 37.25¢
Brass, 10 ton lots	33.625¢
Copper, electrolytic	34.25¢
Copper, reduced	\$2.55
Cadmium	\$3.50
Chromium, electrolytic, 99% min.	27.80¢
Lead	55.00¢
Manganese	\$2.65
Molybdenum, 99%	66.00¢
Nickel, unannealed	68.00¢
Nickel, spherical, minus 30 mesh, unannealed	34.00¢
Silicon	8.5¢ plus metal cost
Solder powder	75.0¢
Stainless steel, 302	\$1.155
Tin	\$2.90
Tungsten, 99%	17.75 to 22.25¢
Zinc, 10 ton lots	

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	\$16.00 to \$18.00
Connellsville, Pa.	
Foundry, beehive (f.o.b. oven)	\$16.00 to \$18.00
Connellsville, Pa.	
Foundry, Byproduct	
Buffalo	\$22.75 to \$23.10
Chicago, del'd	23.90
Chicago, f.o.b.	20.85
Detroit, f.o.b.	19.40
New England, del'd	22.75
Seaboard, N. J., f.o.b.	21.50
Philadelphia, f.o.b.	20.55
Swedeland, Pa. f.o.b.	20.50
Painesville, Ohio, f.o.b.	20.90
Erie, del'd	19.95
Cleveland, del'd	22.45
Cincinnati, del'd	21.40
St. Paul, del'd	23.17
St. Louis, del'd	20.98
Birmingham, del'd	18.66

REFRACTORIES

(F.o.b. Works)

	Per 1000
Fire Clay Brick	
First quality, Pa., Md., Ky., Mo. (except Salina, Pa., add \$5)	\$80.00
No. 1 Ohio	74.00
Sec. quality, Pa., Md., Ky., Mo.	74.00
No. 2 Ohio	66.00
Ground fire clay, net ton, bulk (except Salina, Pa., add \$1.50)	11.50
Silica Brick	
Mt. Union, Pa., Ensley, Ala.	\$80.00
Childs, Pa.	84.00
Hays, Pa.	85.00
Chicago District	89.00
Western, Utah and Calif.	95.00
Super Duty, Hays, Pa., Athens, Tex.	85.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	\$13.75 to 14.00
Silica cement, net ton, bulk, Hays, Pa.	16.00
Silica cement, net ton, bulk, Ensley, Ala.	15.00
Silica cement, net ton, bulk, Chicago District	14.75
Silica cement, net ton, bulk, Utah and Calif.	21.00
Chrome Brick	
Standard chemically bonded, Balt., Chester	\$69.00
Magnesite Brick	
Standard, Balt. and Chester	\$91.00
Chemically bonded, Balt. and Chester	80.00
Grain Magnesite	
Std. 3/4-in. grains	
Domestic, f.o.b. Balt. and Chester, in bulk, fines removed	\$56.50
Domestic, f.o.b. Chewelah, Wash., in bulk with fines	\$30.50 to \$1.00
In sacks with fines	\$5.00 to \$5.50
Dead Burned Dolomite	
F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk, Midwest, add 10¢; Missouri Valley, add 20¢	\$12.25

PRICES

WAREHOUSE PRICES

Base prices, f.o.b. warehouse, per 100 lb.
(Metropolitan area delivery, add 15¢ to base, except New York, add 20¢)

CITIES	SHEETS			STRIP		PLATES	SHAPES	BARS		ALLOY BARS			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled			Hot-Rolled	Cold-Finished	Hot-Rolled, A 4615 As-rolled	Hot-Rolled, A 4140-50 Ann.	Cold-Drawn, A 4615 As-rolled	Cold-Drawn, A 4140-50 Ann.
Philadelphia	\$5.15	\$6.31	\$7.27	\$5.35	\$6.51	\$5.37	\$5.09	\$5.35	\$6.18	\$9.14	\$9.29	\$10.54	\$10.69
New York	5.71	6.57	7.52	5.68	6.51	5.62	5.24	5.57	6.31	9.17	9.32	10.40	10.55
Boston	5.40	6.28	7.25	5.58	6.48	5.78	5.32	5.63	6.18	9.17	9.32	10.40	10.55
Boston	5.98	6.43	7.89	5.88	6.73	5.68	5.32	5.63	6.38	9.53	9.68	10.77	10.92
Boston	5.48	6.39	7.56	5.54	6.75	5.74	5.39	5.68	6.24	9.40	9.55	10.84	10.92
Baltimore	5.64	6.39	7.83	5.89	6.79	5.64	5.39	5.69	6.34	9.44	9.59	10.94	11.09
Chicago	5.28	6.18	7.15	5.34	6.15	5.53	5.33	5.39	6.13	9.17	9.32	10.40	10.55
Chicago	4.85	5.75	7.15	4.85	6.15	5.10	4.90	4.90	5.70	9.35	9.60	10.80	11.05
Milwaukee	5.10	5.95	7.30	5.30	6.32	5.22	5.07	5.07	5.87	9.15	9.32	10.52	10.67
Milwaukee	5.02	5.92	7.12	5.02	6.32	5.27	5.07	5.07	5.87	9.17	9.32	10.57	10.72
Norfolk	5.07	5.75	7.47	5.37	6.32	5.27	5.07	5.07	5.87	9.17	9.32	10.57	10.72
Cleveland	4.98	5.75 ¹	7.18	5.02	6.70	5.35	5.16	5.16	5.70	9.14	9.29	11.05	11.30
Cleveland	5.20	6.04 ¹	7.44	5.05	6.70	5.54	5.42	5.42	5.95	9.68	9.83	11.05	11.30
Buffalo	4.85	5.75	7.65	5.68	6.35	5.35	5.10	5.05	5.90	9.70	9.95	11.15	11.40
Detroit	5.20	6.05	7.70	5.25	6.25	5.50	5.30	5.30	6.02	9.31	9.20	10.72	10.87
Detroit	5.55	6.50	7.70	5.70	6.55	5.55	5.37	5.37	6.07	9.55	9.47	10.95	11.10
Cincinnati	5.14	5.82	6.97	5.25	6.31	5.50	5.30	5.30	6.06	9.31	9.50	10.75	10.90
St. Louis	5.36 ⁸	6.21 ⁸	7.65	5.62 ⁸	6.31	5.71 ⁸	5.47 ⁸	5.62 ⁸	6.17 ⁸	9.35	9.51	10.76	10.91
St. Louis	5.19	6.04	7.29	5.19	6.49	5.39	5.24	5.24	6.04	9.69	9.84	11.14	11.39
Pittsburgh	4.85	5.75 ¹	7.15	5.00	5.95	5.05	4.90	4.90	5.65	9.35	9.60	10.40	10.55
Pittsburgh	4.90	5.75 ¹	7.15	5.05	5.95	5.25	5.15	5.15	5.80	9.35	9.60	10.40	10.55
St. Paul	5.41	6.31	7.30	5.41	6.31	5.66	5.46	5.46	6.28	9.91	10.10	11.36	11.61
Omaha	5.92	6.82	7.71	5.92	6.82	6.17	5.97	5.97	6.77	9.91	10.10	11.36	11.61
Birmingham	5.05 ¹	6.36	6.45	5.05 ¹¹	6.36	5.25 ¹¹	5.00 ¹¹	5.00 ¹¹	6.68	9.80	9.85	10.75	10.95
Houston	6.40	7.85 ¹	8.80	6.40	7.85 ¹	6.35	6.20	6.20	7.60	10.90	10.85	12.40	12.65
Los Angeles	6.30	7.85 ¹	7.95	6.60	9.35 ⁵	6.10	5.75	6.05	7.85 ¹⁵	10.90	10.85	12.40	12.65
San Francisco	6.40	7.90	8.90	6.68	9.35 ⁵	7.40	5.90	5.90	8.45	10.90	10.85	12.40	12.65
San Francisco	5.95 ⁸	7.15 ²	8.25	6.78 ⁸	8.25	6.30	5.90	5.90	7.55	10.90	10.85	12.40	12.65
Portland	6.50 ⁴	8.00 ²	8.15 ²	6.85 ⁴	8.00 ²	6.30 ⁴	6.25 ⁴	6.25 ⁴	8.25 ⁴	10.45 ¹⁵	10.45 ¹⁵	12.05 ¹⁵	12.05 ¹⁵
Seattle	6.20 ⁴	7.75 ²	7.65	6.55 ⁴	7.75 ²	6.20	6.15	6.05 ⁴	8.00 ¹⁴	10.30 ¹⁵	10.30 ¹⁵	12.00 ¹⁵	12.00 ¹⁵
Salt Lake City	6.30 ⁴	7.85 ²	8.00	6.65 ⁴	7.85 ²	6.30	6.25	6.15 ⁴	8.10 ¹⁴	10.40 ¹⁵	10.40 ¹⁵	12.05 ¹⁵	12.05 ¹⁵
Salt Lake City	8.00	8.20	7.90	7.10	8.20	5.75	5.65	5.65	7.55	10.40 ¹⁵	10.40 ¹⁵	12.05 ¹⁵	12.05 ¹⁵

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED:

Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED:

Sheets, 400 to 1999 lb; strip, extras on all quantities bars 1000 lb and over.

ALLOY BARS:

1000 to 1999 lb.

GALVANIZED SHEETS:

450 to 1499 lb.

EXCEPTIONS:

(1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 300 to 4999 lb; (4) 300 to 9999 lb; (5) 2000 lb and over; (6) 1000 lb and over; (7) 400 to 14,999 lb; (8) 400 lb and over; (9) 500 to 1999 lb; (10) 500 to 999 lb; (11) 400 to 3999 lb; (12) 450 to 3749 lb; (13) 400 to 1999 lb; (14) 1500 lb and over; (15) 1000 to 4999 lb; (16) 4000 lb and over; (17) up to 1999 lb.

PIG IRON PRICES

Dollars per gross ton. Delivered prices represent minimums. Delivered prices do not include 3 pct tax on freight nor the 6 pct increase on total freight charges in the Eastern Zone, effective Jan. 11, 1949.

PRODUCING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Producing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	48.00					Boston	Everett	\$0.50 Arb.		52.75	50.50		
Birmingham	42.88	43.38				Boston	Steelton	6.27	54.27	54.77	55.27	55.77	60.27
Buffalo	47.00	47.00	47.50			Brooklyn	Bethlehem	3.90	51.90				
	48.00*	48.00*	48.50*			Cincinnati	Birmingham	6.09	48.97	49.47			
Chicago	46.00	46.50	46.50	47.00		Jersey City	Bethlehem	2.39	50.39				
Cleveland	46.00	46.50	46.50	47.00	51.00	Los Angeles	Provo	6.93	52.93	53.43			
Duluth	46.00	46.50	46.50	47.00		Mansfield	Cleveland-Toledo	3.03	49.03	49.53	49.53	50.03	54.03
Erie	46.00	46.50	46.50	47.00					48.53	49.03			
Everett		52.75	50.50			Philadelphia	Bethlehem	2.21	50.21				
Granite City	47.90	48.40	48.90			Philadelphia	Swedeland	1.31	51.31	51.81	52.31	52.81	
Ironton, Utah	62.00	62.50				Philadelphia	Steelton	2.81	50.81	51.31	51.81	52.31	56.81
Lone Star, Texas		75.00†				San Francisco	Provo	6.93	52.93	53.43			
Neville Island	46.00	46.50	46.50			Seattle	Provo	6.93	52.93	53.43			
Provo	46.00	46.50				St. Louis	Granite City	0.75 Arb.	48.65	49.15	49.65		
Sharpsville	46.00	46.50	46.50	47.00									
Steelton	48.00	48.50	49.00	49.50	54.00								
Struthers, Ohio	48.00												
Swedeland	50.00	50.50	51.00	51.50									
Toledo	46.00	46.50	46.50	47.00									
Troy, N. Y.					54.00								
Youngstown	46.00	46.50	46.50										

* Republic Steel Corp. price: Basis: pig iron at Buffalo set by average price of No. 1 hvy. mlt. steel scrap at Buffalo as shown in last week's issue of THE IRON AGE. Price is effective until next Sunday midnight.
† Low Phos, Southern Grade.

Producing point prices are subject to switching charges; silicon differential (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each 0.50 pct manganese content in excess of 1.00

pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron (blast furnace) silicon 6.00 to 6.50 pct. C/L per g.t., f.o.b. Jackson, Ohio —\$59.50; f.o.b. Buffalo \$60.75. Add \$1.25 per ton for each additional 0.50 pct Si. up to 12 pct. Add 50¢ per ton for each 0.50 pct

Mn over 1.00 pct. Add \$1.00 per ton for 0.75 pct or more P. Bessemer ferro-silicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

Charcoal pig iron base price for low phosphorus \$66.00 per gross ton, f.o.b. Lyles, Tenn. Delivered Chicago, \$73.78. High phosphorus charcoal pig iron is not being produced.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, Maximum contract base price, gross ton, lump size.	
F.o.b. Birmingham	\$162
F.o.b. Niagara Falls, Alloy, W. Va., Westland, Ont.	\$160
F.o.b. Johnstown, Pa.	\$162
F.o.b. Sheridan, Pa.	\$160
F.o.b. Etna, Pa.	\$163
\$2.00 for each 1% above 82% Mn; penalty, \$2.00 for each 1% below 78%.	
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.	
Carload, bulk	10.0
Ton lots	11.6
Less ton lots	12.5

Spiegeleisen

Contract prices gross ton, lump, f.o.b.	
16-19% Mn	19-21% Mn
3% max. Si	3% max. Si
Palmerton, Pa.	\$61.00
Pgh. or Chicago	\$65.00
	\$62.00
	\$66.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, packed	\$5.5
Ton lots	37.0

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.	
Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, delivered.			
	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn.....	25.25	27.10	28.30
0.10% max. C.....	24.75	26.60	27.80
0.15% max. C.....	24.25	26.10	27.30
0.30% max. C.....	23.75	25.60	26.80
0.50% max. C.....	23.25	25.10	26.30
0.75% max. C.....			
7.00% max. Cl....	20.25	22.10	23.30

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C.	
Carload bulk	8.60
Ton lots	10.25
Briquet, contract basis, carlots, bulk delivered, per lb of briquet	10.0
Ton lots	11.6
Less ton lots	12.5

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct., f.o.b. Keokuk, Iowa, openhearth \$84.00, foundry, \$85.00; \$84.75 f.o.b. Niagara Falls; Electric furnace silvery iron is not being produced at Jackson. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 for each 0.50 pct. Mn over 1 pct.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.	
96% Si, 2% Fe	20.70
97% Si, 1% Fe	21.10

Silicon Briquets

Contract price, cents per pound of briquet, bulk, delivered, 40% Si, 1 lb Si briquets.	
Carload, bulk	6.30
Ton lots	7.90
Less ton lots	8.80

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size, bulk, in carloads, delivered.	
25% Si	13.50
50% Si	11.30
75% Si	13.50
85% Si	14.65
90-95% Si	16.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.			
	Cast Turnings Distilled		
Ton lots	\$2.05	\$2.95	\$3.75
Less ton lots....	2.40	3.30	4.55

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si)	
0.06% C	28.75
0.10% C	28.25
0.15% C	28.00
0.20% C	27.75
0.50% C	27.50
1.00% C	27.25
2.00% C	27.00
65-69% Cr, 4-9% C	20.50
62-66% Cr, 4-6% C, 6-9% Si	21.35
Briquets—Contract price, cents per pound of briquet, delivered, 60% chromium.	
Carload, bulk	13.75
Ton lots	15.25
Less ton lots	16.15

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, delivered.	
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carload	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carload	27.75
Ton lots	30.05
Less ton lots	31.85

Chromium Metal

Contract prices, cents per lb. chromium contained packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.	
0.20% max. C	1.09
0.50% max. C	1.05
9.00% min. C	1.04

Calcium—Silicon

Contract price per lb. of alloy, lump, delivered.	
30-33% Ca, 60.65% Si, 3.00% max. Fe.	
Carloads	17.90
Ton lots	21.00
Less ton lots	22.50

Calcium—Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	19.25
Ton lots	21.55
Less ton lots	22.55

CMSZ

Contract price, cents per pound of alloy, delivered.	
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	19.75
Less ton lots	21.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.	
Ton lots	15.75¢
Less ton lots	17.00¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Ton lots and carload packed	18.00¢
Less ton lots	19.50¢

SMZ

Contract price, cents per pound of alloy, delivered. 60-65% Si, 5-7 Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.	
Ton lots	17.35
Less ton lots	18.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	\$2.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained, V.	
Openhearth	\$2.90
Crucible	3.00
High speed steel (Primos)	3.10
Vanadium pentoxide, 88-92% V ₂ O ₅ , contract basis, per pound Contained V ₂ O ₅	\$1.20
Ferrocolumbium, 50-60% contract basis, delivered, per pound contained Cb.	
Ton lots	\$2.90
Less ton lots	2.95
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo.	\$1.10
Calcium molybdate, 45-50%, f.o.b. Langeloth, Pa., per pound contained Mo.	96¢
Molybdenum oxide briquets, f.o.b. Langeloth, Pa., per pound contained Mo.	95¢
Ferrotitanium, 40%, regular grade, 10% C max., f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	\$1.28
Ferrotitanium, 25%, low carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, ton lots, per lb contained Ti	\$1.40
Less ton lots	1.45
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed east of Mississippi and north of Baltimore, carloads, per net ton	\$160.00
Ferrophosphorus, electrolytic, 23-26%, carlots, f.o.b. Sizlo, Mt. Pleasant, Tenn., \$3 unitage, per gross ton	\$65.00
10 tons to less carload	75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
Ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per pound of alloy.	
Carload, bulk	6.60¢
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	8.90¢
Ton lots	9.80¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	11.00
Carload, bulk	11.25
Ton lots, packed	11.75
Less ton lots	
Boron Agents	
Contract prices per pound of alloy, delivered.	
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D.	
Ton lot	\$1.20
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. X D, delivered.	
Ton lots	\$1.67
Less ton lots	1.79
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	\$1.80
Silicaz, contract basis, delivered.	
Ton lots	45.00¢
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	93¢
No. 6	63¢
No. 79	45¢
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, f.o.b. Suspension Bridge, N. Y., freight allowed, Ti 15-18%, B 1.00-1.50%, Si 2.5-3.0%, Al 1.0-2.0%.	
Ton lots, per pound	8.625¢
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	\$6.25